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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

FOR

APRIL 1954

HANFORD

55031

Compiled By
DEPARTMENT MANAGERS

May 21, 1954

RICHLAND, WASHINGTON

Operated for the Atomic Energy Commission
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MONTHLY REPORTS

HANFORD ATOMIC PRODUCTS OPERATION

APRIL 1954

GENERAL SUMMARY

Production Operations

In the Metal Preparation Section production of normal charge material for the month was 96 percent of forecast. Lower than forecasted production was due principally to converting entirely to our-inch slug production toward the end of the month. The overall canning yield for April was 83.7 percent.

The total reactor input plutonium production was 102.9 percent of the official forecast and the output was 112.3 percent of forecast. P-10 production was of forecast. A total of 24 ruptures occurred during April including 20 normal uranium slugs, one "J" slug, two "E" slugs, and one 10-66 piece.

On April 28, the ferric sulfate water treatment process was changed to the alum-activated silica coagulant process at B Reactor. All areas are now using alum-activated silica in the preparation of process water.

The first irradiated J material of the present J-N program was shipped offsite on April 12.

The Redox production was 124 percent of forecast for the month. TBP production was 167 percent of the official forecast. UO_3 facility production was 150 percent of forecast. All commitments for 234-5 production were met with the exception of unfabricated buttons which were 99 percent achieved.

Engineering Technology

Design of the Hot Semiworks Conversion, CA-513-D was advanced to 100 percent completion during April. This does not include the design of the waste self-concentrator, which was advanced to 75 percent completion. Detail design of the 300 Area Expansion, CA-514, was advanced to 90 percent completion. Overall design on CG-558, Reactor Plant Modification for Increased Production, was advanced to 15.6 percent completion.

Twenty-one informal, five Class I and one Class II radiation incidents were recorded.

Personnel and Services

No major injuries were reported in April. Three sub-major injuries were reported. Minor injuries increased from 313 to 387.

The employee separation rate increased from .52 percent for March to .67 percent for April.

On April 15 a bill was presented to Congress for disposal of federally-owned properties at Richland, and studies are being made of the proposed legislation.

As of April 30 there were 267 housing applications pending.

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STAFF

General Manager, Atomic Products Division . . . . . F. K. McCune

General Manager, Hanford Atomic Products Operation . . . . . W. E. Johnson

Counsel . . . . . G. C. Butler

Manager, Finance . . . . . D. M. Johnson

Manager, Employee and Public Relations . . . . . C. N. Gross

Director, Radiological Sciences . . . . . H. M. Parker

Manager, Engineering . . . . . A. B. Greninger

Manager, Manufacturing . . . . . J. E. Maider

Manager, Plant Auxiliary Operations . . . . . H. D. Middel

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
APRIL 30, 1954

	EXEMPT		OTHER		TOTAL	
	4-30-54	3-31-54	4-30-54	3-31-54	4-30-54	3-31-54
Engineering Department						
General	17	17	74	74	91	91
Design	174	176	129	127	303	303
Project	268	259	170	191	438	450
Technical Section						
General	10	6	2	2	12	8
Applied Research	122	120	52	55	174	175
Separations Technology	121	124	39	38	160	162
Pile Technology	101	102	66	63	167	165
Fuel Technology	71	71	71	68	142	139
Advance Technology	11	11	1	1	12	12
Manufacturing Department						
General	15	16	7	7	22	23
Reactor	265	258	1 077	1 063	1 342	1 321
Separations	291	295	1 238	1 228	1 529	1 523
Metal Preparation	96	98	429	445	525	543
Plant Auxiliary Operations Department						
General	1	1	1	1	2	2
Elec. Dist. & Telephone	30	30	139	139	169	169
Transportation	45	45	442	443	487	488
Purchasing & Stores	52	51	226	223	278	274
Plant Protection						
General	1	1	1	1	2	2
Patrol & Security	59	59	443	449	502	508
Safety & Fire	30	30	107	108	137	138
Office Services	20	20	281	284	301	304
Administration Main. Service	10	10	52	52	62	62
Operations Analysis	40	42	65	67	105	109
Financial Department						
Financial General	6	7	4	2	10	9
Costs & Budgets	27	27	101	98	128	125
General & Personnel Accounting	18	19	114	118	132	137
Property Accounting	15	14	40	40	55	54
Audits & Procedures	18	18	3	3	21	21
SF Accountability	5	5-a)	22	22-a)	27	27-a)
Employee & Public Relations Dept.						
Community General	-	-	-	1	-	1
Community Operations	69	68	169	167	238	235
Real Estate Services	22	23	164	162	186	185
Health & Safety	54	54	213	214	267	268
Management	7	6	3	2	10	8
Salary Administration	5	5	6	5	11	10
Employee Relations	21	22	41	41	62	63
Public Relations	4	4	22	21	26	25
Union Relations	8	8	8	8	16	16
Technical Personnel						
Staff	4	4	7	7	11	11
Others	-	-	46	47	46	47

(a- Included in Administrative Practices Department at 3/31/54. In addition, nine other employees included above as Financial Department were in Administrative Practices Department at 3/31/54.

	EXEMPT		OTHER		TOTAL	
	4-30-54	3-31-54	4-30-54	3-31-54	4-30-54	3-31-54
diological Sciences Department						
General	3	4	3	3	6	7
Records & Standards	29	28	143	143	172	171
Biophysics	58	58	61	60	119	118
Biology	36	36	37	36	73	72
Engineering	6	6	1	1	7	7
Legal	2	3	3	3	5	6
Special Study	3	1	1	0	4	1
TOTAL	2 270	2 262	6 324	6 333	8 594	8 595

AREA PERSONNEL DISTRIBUTION

APRIL 30, 1954

	100-B AREA	100-D AREA	100-F AREA	100-H AREA	100-K AREA	101 AREA	200-E AREA	200-W AREA	300 AREA	700-1100-3000 AREA AND PLANT GENERAL	TOTAL
Engineering Department											
Exempt	31	79	-	12	47	-	73	56	260	337	895
Other	17	33	4	44	22	-	21	28	192	243	604
Total	48	112	4	56	69	-	94	84	452	580	1 499
Manufacturing Department											
Exempt	81	58	53	72	9	-	5	268	96	25	667
Other	282	252	390	161	7	-	98	1 109	441	11	2 751
Total	363	310	443	233	16	-	103	1 377	537	36	3 418
Plant Auxiliary Operations											
Exempt	26	7	9	7	7	-	12	17	12	191	288
Other	55	54	99	58	67	11	80	172	119	1 042	1 757
Total	81	61	108	65	74	11	92	189	131	1 233	2 045
Financial Department											
Exempt	-	-	-	1	-	-	1	2	5	80	89
Other	-	-	2	1	-	-	3	2	19	257	284
Total	-	-	2	2	-	-	4	4	24	337	373
Employee & Public Relations											
Exempt	-	2	-	1	-	-	4	2	2	183	194
Other	4	9	7	6	4	-	2	7	23	617	679
Total	4	11	7	7	4	-	6	9	25	800	873
Radiological Sciences Department											
Exempt	1	-	38	-	-	-	2	18	60	13	132
Other	10	-	39	-	-	-	7	17	157	15	245
Total	11	-	77	-	-	-	9	35	217	28	377
General											
Exempt	-	-	-	-	-	-	-	-	-	5	5
Other	-	-	-	-	-	-	-	-	-	4	4
Total	-	-	-	-	-	-	-	-	-	9	9
Total Exempt	139	146	100	93	63	-	97	363	435	834	2 270
Total Other	368	348	541	270	100	11	211	1 335	951	2 189	6 324
GRAND TOTAL	507	494	641	363	163	11	308	1 698	1 386	3 023	8 594

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MANUFACTURING DEPARTMENT

APRIL 1954

May 11, 1954

METAL PREPARATION SECTION

The net production of acceptable slugs was 241 tons which was 96 percent of the official forecast. The lower than forecasted production was due principally to converting entirely to four-inch slug production toward the end of the month. The lower throughput of four-inch material combined with the low yields resulted in reduced production rates. A total of 223 tons was canned as eight-inch slugs and the remaining 18 tons as four-inch material. The canning yields were 85.3 percent and 65 percent, respectively. The over-all canning yield was 83.7 percent. The improvement in the eight-inch canning yield resulted from a reduction in the poor bond type rejects. The four-inch yield on the other hand was adversely affected by increased poor bond type rejects which occurred in large numbers with the defects showing as small pinholes in the side of the weld. The cause has not yet been determined.

There were no autoclave failures during the month.

The canning of enriched uranium alloy fuel slugs continued with 9,582 slugs being cold canned with a yield of 75 percent. A total of 11,100 lithium alloy target slugs was cold canned with a yield of 79 percent.

A canning yield of 56 percent was realized on the hot press canning of 391 extruded fuel slugs during the month. Poor bonding was the major reject cause.

REACTOR SECTION

The total reactor input plutonium production was 102.9 percent of the official forecast, and the output was 112.3 percent of forecast. The over-all reactor operating efficiency for the month was 78.8 percent. The low operating efficiency was due principally to the outages associated with 24 ruptured slugs.

The established maximum operating levels (excluding enrichment burnout) were increased a total of 64 MW during April including 15 at the B Reactor, 25 (Pu and P-10) at the DR Reactor and 24 at the H Reactor. At the B Reactor the increase was attributed to improved flattening; at the DR Reactor to a revision of exit water temperature permissible limits (now based on average of highest ten tubes rather than the highest individual tube temperature); at the H Reactor to increased helium concentrations up to 50 percent as permitted by the production test on irradiation of thorium and U-235 alloy slugs for U-233 production.

The program for discharging the normal irradiated uranium metal, at two concentrations as originally planned, continued with a total of 94 tons of metal being discharged at the low and 189 tons at the higher concentrations.

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REACTOR SECTION (Continued)

The P-10 program at DR Reactor continued during April with the charging of an additional 327 J-N tubes as part of the second P-10 irradiation cycle. The P-10 program at C Reactor continued during April without incident, and without the charging of any additional tubes.

The irradiation of 12 J-Q (thorium) tubes, charged at H Reactor in March on a production test basis to investigate the feasibility of large scale thorium irradiation, continued with no difficulties during April.

A total of 24 ruptures occurred during April including 20 normal uranium slugs, one J slug, two E (enriched uranium) slugs and one 10-66 (thorium) piece. Of the uranium pieces, thirteen were eight-inch and seven the four-inch material. A total of 470 hours of outage time resulted from the ruptures.

During April 24 scrams occurred. Nineteen of the scrams at C, D, DR, and F Reactors were caused by normal Panellit system difficulties. One scram at F Reactor resulted from an electrical power surge on the BPA system. Two scrams occurred at H Reactor, one caused by an electrical fire in No. 22 vertical rod switch in the control room, and one as the result of malfunctioning of a temperature monitoring instrument on a production test recirculation tube. One scram at C Reactor occurred as a result of improper by-passing of the B-C Reactor Safety circuit inter-tie while making revisions to the B Reactor portion of the inter-tie. One low pressure scram occurred at D Reactor on a water quality production test tube when the supply pump failed causing a momentary drop in pressure. Total outage time charged to these scrams was 8.0 hours.

One process tube leak occurred at the C Reactor in conjunction with a ruptured slug. During reactor operation, subsequent to the tube replacement, a total of 285 gallons of water were removed from the reactor.

The F Reactor continued to operate during April with a distorted flattening pattern to compensate for the loss of reactivity (approximately 100 ih) attributed to boron in the graphite. This incident resulted from a horizontal rod and thimble leak late in February.

During a gas leak testing program at B Reactor on April 29, horizontal rod thimbles No. A, B, 4 and 7 were found to be leaking. Rods No. 4 and 7 were removed from service and the thimbles blanked off pending repairs scheduled for the next outage. At that time, blanking off of A and/or B thimbles for subsequent replacement is planned. Other horizontal rod work during April, necessary because of thimble leaks, included removal and replacement of No. 6 thimble at B Reactor, and removal from service of No. 5 rod at DR Reactor with blanking off of the thimble.

On April 28 the ferric sulfate water treatment process was changed to the alum-activated silica coagulant process at B Reactor. All areas are now using alum-activated silica in the preparation of process water.

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REACTOR SECTION (Continued)

The first irradiated J material of the present J-N program was shipped off-site on April 12.

SEPARATIONS SECTION

The Redox production was 124 percent of the official forecast for the month. The operation of the T Plant during the first half of the month was directed toward a program of vessel cleanout and maintenance activities in preparation for the processing of low M&D material. The first of the material was charged on April 17 and processing started on April 22. Failure of the Concentration Building D-1 tank on April 26 forced suspension of operations until April 28 when the D-1 tank was replaced and vessel flushings were completed. The first batch of material was transferred from the Canyon to the Concentration Building on April 30.

The Redox plant shutdown for crane decontamination and maintenance on March 29 was concluded on April 8 when operations were resumed at a 5 tons per day rate. The feed rate was increased to seven tons per day on April 9 and continued at this rate until April 19, when plugging in a waste transfer jet resulted in a reduction to 5 tons per day. On April 20 the extraction batteries were shut down for 15 hours for the replacement of the centrifuge feed tank agitator. Startup was resumed on April 21, and operations continued on rates varying from 5 to 7 tons until April 29 when the plant was shut down because of the 1-A column feed valve failure.

The revisions of the head-end feed preparation procedure to provide ample reflux before the addition of permanganate, and an increase in the permanganate temperature have been instrumental in lowering ruthenium emission to below one-half curie per batch of feed oxidized. Data from the recently installed strip filter have also permitted curtailment of reflux during the latter portion of the oxidation, consequently shortening the time cycle by nearly three hours.

The completion of the recycle addition facilities has permitted addition of Isolation and Metal Fabrication Buildings recycle to the Redox process. Recycle from the Isolation Building is now being received on a current basis without noticeable effects on the process, and testing of various types of recycle from the Metal Fabrication Building is in progress.

The TBP Plant production was 167 percent of the official forecast. Maximum production rates of 15.5 tons per day were attained, and the over-all rate for the month was 10 tons per day. Major outages for the plant for April were 110 hours for A Line and 19.5 hours for the B Line. These were caused by failure of the condenser vent blower motor, two waste concentrator pumps, and the A Line RA column feed pump. Employment of the heated extractant (RCX) was continued throughout the month. Waste losses continued to be low at an average of 0.81 percent for the month.

The UO_3 facility production was 150 percent of the official forecast. An average rate of 14 tons per day was achieved for the month. First calcinations were conducted in one of the newly installed gas fired furnaces (Luckey pots) during the month. One carload of uranium oxide has been produced incorporating sulfamic acid as an additive to improve the oxide reactivity.

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SEPARATIONS SECTION (Continued)

The 234-5 commitment of final shapes was of the forecast, and 99 percent of the commitment of the unfabricated buttons was attained. The required nitrate production for shipment was also produced.

The waste evaporators operated throughout the month with volume reduction of 34.9 percent at B and 30 percent at T. The feed for both evaporators was TBP Waste.

The waste metal removal rates were very satisfactory, with no major equipment difficulties being experienced during the month.

The P-10 feed consisted entirely of N material for the month and production exceeded the forecast by 63 percent. Product purity averaged for the month. On April 26, operations were suspended as all available feed material had been processed.

GENERAL

Members of the Detroit Edison Board of Directors were conducted on a tour of manufacturing areas on April 1, 1954.

April visitors to the manufacturing areas included J. P. Hood, A. E. Daking and R. M. Larsen from the Wilmington Offices of the duPont Company on April 27, 28 and 29.

Personnel

Total on Roll April 1, 1954	3410
Accessions	48*
Separations	36*
Total on Roll April 30, 1954	3422

*Does not include intra-department transfers.

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF APRIL 1954

May 11, 1954

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

INVENTOR	TITLE
None.	

J. E. MAIDER, MANAGER
MANUFACTURING DEPARTMENT

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MONTHLY OPERATING REPORT

APRIL 1954

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May 10, 1954

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
APRIL, 1954

I. RESPONSIBILITY

There were no changes in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	April	March	Year To Date
Acceptable Pieces Canned (4")(Tons)Gross	19	28	86
Acceptable Pieces Canned (4")(Tons)Net	18	28	83
Canning Yield (4")(%)	65.0	71.2	66.5
Acceptable Pieces Canned (8")(Tons)Gross	224	194	747
Acceptable Pieces Canned (8")(Tons)Net	223	194	742
Canning Yield (8")(%)	85.3	80.2	77.4
Total Acceptable Pieces Canned (Tons)Gross	243	222	833
Total Acceptable Pieces Canned (Tons)Net	241	222	825
Acceptable Pieces Canned (4" and 8") (% of Forecast)	96	90	89
Autoclave Frequency (4")(No./M)	.00	.00	.00
Autoclave Frequency (8")(No./M)	.00	.02	.02
J-3 Slugs Canned (pieces)	9799	10936	30965
N Slugs Canned (pieces)	11100	13704	31236
Chem. 10-66 Canned (pieces)	300	0	746

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1. Statistics (Continued)

	April	March	Year To Date
Special Request (man hours)	557	363	2196
305 Routine Tests (man hours)	626	868	1809
305 Special Tests (man hours)	258	1481	5081
Average Steam Generated (M lbs/hr)	32.5	41.7	
Maximum Steam Generated (M lbs/hr)	47.0	61.0	
Total Steam Generated (M lbs)	23100	31100	
Coal Consumed (Tons)	1542	1904	
Sanitary Water from 3000 Area (million gallons)	42.5	44.5	
Total Water from 3000 Area Average Rate (gpm)	952	997	
Chlorine Residual (ppm)	0.39	0.38	

2. Activities

The net production of acceptable slugs was 241 tons of which 93 percent were eight-inch. The canning yields for eight-inch slugs increased five percent over the previous month while the yield for four-inch decreased by seven percent. The improvement in the eight-inch yield resulted from a reduction in the poor bond type rejects. The four-inch yield on the other hand suffered from an increase in the poor bond rejects which occurred spasmodically in large numbers, the defect showing as a small pin hole in the side of the weld. The cause has not yet been determined.

The canning lines operated without relief until April 26, 1954 when two lines were relieved.

There were no autoclave failures reported during the month.

As a result of the curtailment of the P-10 program, 20 operators were made available for transfer to the Reactor Section which will complete the seniority split between the 300 and 100 Areas.

During the recent difficulties with crack sensitive caps caused by an unfavorable iron-silicon ratio, a double weld pass technique was developed to minimize rejects of this type. As most of the crack sensitive material has been utilized, the process has been converted to the standard single weld pass method. It is believed this assures the greatest weld integrity of the finished piece.

In order to assure adequate quality control protection at low cost, the Process Sub-Section has assumed the responsibility from the Fuel Technology Sub-Section for the product and process conformance checking at the FMPC rolling mill. Conformance on these items has previously been carried out by the Engineering Department through "red tag" samples which were shipped from Hanford to Fernald. In the new procedure, metallurgical samples were selected and prepared by Fernald according to HAPO direction and are interpreted by Hanford observers during regular visits to Fernald.

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2. Activities (Continued)

A complete revision of the "A" and "F" process standards has resulted in a consolidated standard which contains all the recent changes and improvements of the Technical Specifications.

In a series of tests conducted, it has been shown that the use of Teflon-covered etch baskets results in a substantial reduction in the number of marred surface rejects. Tests conducted at final etch showed that marred surfaces were about 65 percent less when covered baskets were used. Action has been taken to have all baskets covered with Teflon.

From a test of 1000 regular slugs, about 250 slugs have been radiographed in the area of the weld bead in a program designed to provide standards for the routine application of this operation. Numerous voids and inclusions have been observed on the radiograph film and several of these pieces have been stripped to measure the weld metal that covers the voids. In all cases the weld metal protecting the slugs from water attack has proved to be greater than the minimum can wall thickness.

Recovery of scrap AlSi was continued during the month. At the present time, facing lathe turnings constitute the major source of scrap that is being considered for reuse in the canning bath. This will produce about 1900 pounds of usable AlSi per week as compared with the normal weekly consumption of 3,000 pounds. Prior to use in the canning furnaces, reclaimed AlSi must meet the analytical and thermal analysis specifications set forth in the "F" process.

3. Special Operations

The P-10 production reverted to a two-shift basis on April 12, 1954 and target slug canning was further reduced to one shift on April 26. It is expected that the first phase of the P-10 slug canning operation will be completed by the middle of May.

A total of 9,582 enriched uranium-aluminum alloy fuel slugs were canned by the regular "C" process with a canning yield of 74 percent and 11,100 lithium alloy target slugs were canned with a canning yield of 79 percent.

A canning yield of 56 percent was realized on the hot press canning of the 391 extruded fuel slugs which were canned at the end of March. Poor bond rejects was the major cause for rejection.

Two hundred twenty-two eight-inch alpha extruded normal uranium slugs were canned under the provisions of PT-313-105-31M.

4. Schedule Variation

Canned slug production was 96 percent of forecast because of the low yield realized on the four-inch slug canning.

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B. Equipment Experience

1. Operating Continuity

Line operating efficiencies attained a very high level for the month.

Lead dip canning has drastically reduced the canning equipment maintenance. There was one crucible replaced this month versus an average of eleven per month previously. There were no element failures this month when previously the average was seven per month.

C. Improvement Experience

1. Production Tests

PT-313-105-24M "Pile Evaluation of Tru-line Cans and Caps" (HW-28040). Investigators from the Fuel Technology Sub-Section, after exhaustive testing, have decided that the 1000 Tru-line slugs suspected of having excessive AlSi penetration will be acceptable for shipment to the reactor after passing the frost test, autoclave, and final inspection.

PT-313-105-25M "Lead Dip Canning and Irradiation of Uranium Slugs Machined from Salt Bath Heat Treated Fernald Rolled Rods" (HW-28149). Approximately 41,500 eight-inch slugs canned on an extension of this production test are in storage in the 300 Area. The four-inch slugs canned under this test have all been shipped to the reactor. Future lead dip canning will be covered by the "F" process specifications so the PT-25M extension will no longer be needed to cover regular production.

2. Process Tests and Revisions

The change to the 50-seconds canning cycle for the lead dip process has proven satisfactory and its adoption will increase production capacity by six percent. This will result in an estimated monthly savings of $9,000.00.

As a result of the improvement in digesting the bonding layer of lead dip canned material, a standard hour-and one-half cycle can now be maintained in Slug Recovery which is a reduction of approximately 50 percent from the cycle required for triple dip slugs.

3. Inventions and Discoveries

Personnel in the Metal Preparation Section engaged in work which might be expected to result in inventions or discoveries have reported no inventions or discoveries were made during the period covered by this report.

D. Events Influencing Costs

1. Labor Variance

All slugs were processed by the lead dip process with significant yield improvement and, in addition, a reduction in canning cycle from 53-to

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1. Labor Variance (Continued)

50-seconds has increased operating efficiency, resulting in a slight decrease of unit cost.

2. Material Variance

Yield improvement, lower material costs for lead dip canning, and a reduction in steel sleeve consumption are expected to reduce the unit cost of process materials about .03 per unit.

3. Other Costs

Because of yield improvement and a redistribution of overhead costs chargeable to the P-10 program, other costs will decrease about .01 per unit.

E. Plant Expansion

1. Project Status

Project CA-514 - "Expansion of 300 Area Production Facilities." Design on the overall project is 89 percent complete, and construction 40 percent complete. The total funds authorized to the General Electric Company for AE and AEM functions was increased from $1,975,000 to $4,135,000 by Work Authority No. CA-514(8), dated April 6, 1954 and Project Authorization No. 501, dated April 7, 1954. Total project costs to date amount to approximately $1,925,000. The physical completion date is scheduled for March 1, 1955. The renovation of the existing 313 building is about 33 percent complete. Phase II construction on the 313 building addition is about 45 percent complete. The lump sum position is about 84 percent complete.

A $43,269 contract was awarded April 6, 1954 to National Blower and Sheet Metal Company of Tacoma by the Atomic Energy Commission for the installation of heating and ventilating systems in the 313 building addition. About seventy-five days will be required to complete this work.

Work is continuing on the solution make-up facilities in 303-F building and the tank farm for caustic, acid and methanol storage. The foundation has been poured and steel erected to house the methanol still. Storage tanks for caustic have been set and the pipe trenches poured.

Construction on the 3701-L Gate House and parking lot expansion is 75 percent and 70 percent complete, respectively. Completion is scheduled for May 26, 1954.

Project CG-573 - "Hanford 3X Program - 300 Area." Scoping of the 3X facilities is 70 percent complete, design 66 percent, and construction 58 percent complete. Total project costs plus commitments to date approximate $570,000.

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1. Project Status (Continued)

Because of a reduction in the P-10 program, hot press canning has been deleted from the 303-J building and expanded dry canning facilities will be installed in this building. The percentages outlined above reflect this change in scope. Construction work in 303-J building will be resumed on or about May 15, 1954, pending completion of design changes.

Construction of the combined dry canning and hot press canning facilities in 313 building is progressing as initially scoped. Because of procurement problems it now appears that the ready-for-use date of this facility will be delayed until the later part of June, 1954.

2. Plant Engineering

An economic analysis was made to determine the benefits of statistical sampling methods currently used in the inspection of process caps. Results indicate that a savings of $300 per month in direct labor is realized over the previous 100 percent inspection method. An additional savings of approximately $900 per month is possible if it is feasible to extend this sampling method to include aluminum cans and steel sleeves.

Tests were conducted to determine the effect of applying Fyrex fireproofing compound to storage pallet materials. Laboratory analysis indicated the material was boron-free and it did not cause any appreciable corrosion of aluminum or uranium. The compound contains ammonium phosphate and some question exists on the possible transfer of particles to the reactor units. Fyrex solution was applied by three methods -- brushing, spraying, and dipping. Combustion tests indicated that treated materials were somewhat more fire-resistant. Details have been summarized and circulated by letter dated April 9, 1954.

"Markal" high temperature protective coating for metal was tested on the process canning baskets during the month. One-half of a basket was coated and the other half left unprotected during a normal five-day usage of the basket in the canning bath. Inspection of the basket at the end of the test showed no detectable protection afforded by the coating.

A Mead impact hammer has been received and is being equipped with a mounting stand and accessories for stamping canned slugs. If this type of stamping device proves satisfactory, a production unit will be designed for inclusion in the expansion program.

Difficulty encountered in removing warped or eliptical steel process sleeves from the gauging mandrel led to the design of a power operated, retractable mandrel for this inspection station. This unit was fabricated and is currently being tested.

F. Significant Reports Issued

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1. Routine

Number	Title	Author	Date
HW-31296	Monthly Report, Process Sub-Section Metal Preparation Section, March 1954	EW O'Rorke	4-1-54
HW-31358	Metal Preparation Section Evaluation of J Slugs, February and March 1954	TD Naylor	4-6-54

2. Non-Routine

HW-31395	Special Box of Striated and Seamy Slugs	SM Gill	4-7-54
HW-31490	Rejection of Bare Slugs for Striations	SM Gill	4-16-54
HW-31568	Uranium Slug Quality Control at Fernald, Trip Report, March 22-27, 1954	SM Gill	4-22-54
HW-31596	Extruded Fuel Slug Cores(J Slugs)	TD Naylor	4-23-54
HW-31250	"J" Slug Storage Space	RE Daling	3-31-54

III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month	End of Month	Net Change
Section General	4	4	0
Operations	221	199	-22
Power & Maintenance	256	259	3
Process	40	42	2
Plant Engineering	23	23	0
Section Total	544	527	-17

C. Safety Experience

There were no major or sub-major injuries during the month.

D. Radiation Experience

There were no radiation exposures in excess of 200 mrad per week during the month.

E. Personnel Activities

1. Visits and Visitors

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I. Visits and Visitors

J. H. Kelly attended the American Society of Tool Engineers Exhibit in Philadelphia, April 26-30.

E. W. O'Rorke attended the Metal Quality Steering Committee Meeting at the Mallinckrodt Chemical Works, St. Louis, Missouri. He also visited the Aluminum Company of America at Edgewater, New Jersey and the A.E.C. site at Fernald, Ohio to discuss improvement programs for reactor fuel element components.

H. G. Henry visited Boeing Airplane Company in Seattle for the purpose of technical liaison in quality control equipment and techniques.

R. C. Aungst attended the Metallurgy Information Meeting at the Argonne National Laboratory in Chicago.

R. H. Titman attended the Second Pacific Northwest Quality Control Conference in Seattle.

T. B. Correy, accompanied by representatives of the Engineering Department, visited the Ohio Crankshaft Company and National Acme Company in Cleveland, Ohio; Metal Wash Products Company, Elizabeth, New Jersey; and Udylite Manufacturing Company, Detroit, Michigan during the period of April 12 to April 21. The purpose of the trip was to approve design and provide assistance to vendors supplying equipment for Project CA-514.

R. D. Gilbert attended a Manufacturing Time Standards Conference, sponsored by the General Electric Company, in Schenectady, New York on April 21-23.

2. Meetings

Power and Maintenance and Plant Engineering Sub-Sections attended information meetings on April 13 and April 15. Mr. C. R. Anderson of Separations Section discussed the TBP process and related operations.

Instructions in the arm-lift method of artificial respiration were given to ten groups of the Section during the month.

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Richland, Washington
May 7, 1954

MANUFACTURING DEPARTMENT
REACTOR SECTION
APRIL, 1954

I. RESPONSIBILITY

The responsibility for coordinating the maintenance of Manufacturing Department power essential materials procurement and stocks was transferred from the Plant Engineering Section to the Reactor Section - Power Sub-Section, effective April 1.

II. ACHIEVEMENT

A. Operating Experience

The total reactor input plutonium production during April was 102.9 percent of forecast, although only 96.6 percent of the March production. April plutonium production was lower than March production primarily because of the shorter month, and because a greater percent of the total reactor input production was devoted to the P-10 program. Outages associated with 24 ruptures were responsible for a low time operated efficiency, 78.8 percent, which, although approximately three percent higher than in March, was approximately 10 percent below recent experience.

Reactor plutonium output production during April was 112.3 percent of forecast as a result of revision of discharge schedules because of rupture outages.

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A. Operating Experience (Continued)

The P-10 program at DR Reactor continued during April with the charging of an additional 327 J-N tubes as part of the second P-10 irradiation cycle. The P-10 program at C Reactor continued during April without incident, and without charging any additional tubes.

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The irradiation of 13 J-Q (thorium) tubes, charged at H Reactor in March on a production test basis to investigate the feasibility of large scale thorium irradiation, continued with no difficulties during April. Less than one percent of the input production at H Reactor was devoted to this program.

Established maximum reactor operating levels, exclusive of enrichment burnout, were increased a total of 64 megawatts during April, including 15 megawatts at B Reactor, 25 at DR Reactor and 24 at H Reactor. At B Reactor, the increase was attributed to improved flattening, at DR Reactor to the Process Standard revision in March specifying an exit water temperature limit based upon the average of the 10 highest tube temperatures rather than the highest individual tube temperature, and at H Reactor to increased helium concentrations up to 50 percent as permitted by PT-105-567-A, "Preliminary Irradiation of J-Q Columns."

A total of 24 slugs failed at all reactors during April, including 20 uranium slugs, two "E" slugs, one "J" slug, and one Chemical 10-66 slug. Rupture distribution by reactor and type is tabulated below:

	B	C	D	DR	F	H	Total
Regular material 8-inch	-	2	2	1	1	7	13
Regular material 4-inch	2	-	-	-	5	-	7
J material	-	-	-	1	-	-	1
E material	-	2	-	-	-	-	2
Chemical 10-66	1	-	-	-	-	-	1
Totals	3	4	2	2	6	7	24

The rupture frequency for uranium slugs in April was one rupture less than the most sever experience to date. The total time required for the removal of these ruptures was 469.9 hours. The average concentration of the uranium ruptures was approximately 10 percent above goal concentration, although one rupture occurred at almost twice the goal concentration in material being irradiated on a test basis to investigate higher concentrations.

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A. Operating Experience (Continued)

Subsequent to the discharge of two rupture tubes at H Reactor on April 11, a broken eight-inch slug, physically resembling those previously reported, was found in the storage basin. Since the slugs from the two tubes were the only metal in the basin at the time, the previous theory that metal piling up in the chutes contributed to the breaking of slugs was not involved in this instance. Additional evidence of an in-reactor metallurgical change as the cause of broken slugs was provided by an eight-inch "tru-line" slug discharged at H Reactor on April 30 (PT-313-105-24-M, "Pile Evaluation of Tru-Line Cans and Caps"). The slug had a circular indentation extending around the periphery at the midpoint. The aluminum jacket had not been ruptured. This slug will be sent to the Radiometallurigal Laboratory for examination.

1. Statistics

	B	C	D	DR	F	H	Total or Average
Reactor Time Operated Efficiency (%)	74.7	70.9	77.8	83.0	82.3	84.1	78.8
Reactor Outage Time (Hrs.)							
Plutonium Production	151.9	136.2	134.7	54.7	123.9	111.8	713.2
Special Irradiations							
Tests	30.0	73.6	25.3	67.8	3.0	2.8	202.5
Electrical Power Supply**	-	-	-	-	0.4	-	0.4
Total	181.9	209.8	160.0	122.5	127.3	114.6	916.1
Reactor Unscheduled Outage Time (Hrs.)	181.9	138.9	91.1	88.9	127.3	114.6	742.7
Metal Discharged (Tons)	29.0	64.6	72.6	41.3	52.5	23.4	283.4
Water Quality (ppm Iron)							
Raw Water - Average	0.25	0.22	0.21	0.25	0.15*	0.19*	0.21
Raw Water - Maximum	0.33	0.29	0.31	0.32	0.22*	0.36*	0.31
Process Water - Average	0.018	0.006	0.006	0.005	0.004	0.006	0.008
Process Water-Maximum	0.029	0.014	0.018	0.023	0.015	0.013	0.019
Water Pumped (MM Gals)							
Bldg. 190 to reactor	1735	2867	1787	1703	1716	2030	11838
Bldg. 182 to 200 Areas	-	-	-	-	327	-	327
Bldg. 181	5253		4041		2391	2353	14038
Steam Generated (MM lbs.)	142		194		125	99	560
Coal Consumed (Tons)	8693		12116		7037	5922	33768

*In mid-April, F and H Areas returned to the boil down method of raw water analysis in place of the permanganate method. All areas were employing the boil down method at month end. Although less accurate than the permanganate method, the boil down method is adequate to determine raw water trends and is easier to use.

**Power Surge on BPA electrical system.

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2. Activities

The program of goal concentrations for irradiated uranium was revised during April. Current plans for future discharges include approximately 120 tons per month at a low concentration approximately one-third the former goal concentration, based upon Separations Section T-Plant capacity, and the balance of the output production at the former normal goal concentration. Factors considered in establishing these concentrations included the continued high incidence of ruptures and the capacities of Separations Section facilities. Investigation of the feasibility of higher concentrations will be continued on a test basis. Approximate tonnages discharged during April were 95 at low concentration and 190 at the higher concentration.

During April, at DR Reactor, 327 J-N tubes were charged, and 77 J-N tubes were discharged. At month end, the net total of J-N tubes in DR Reactor was 1365, 940 of which were charged for the second irradiation cycle, and 425 of which remained from the first cycle. At month end, 129 of the 130 J-N tubes charged during February and March in C Reactor remained, one tube having been discharged in April for inspection of the slugs as part of the test program to irradiate J-N tubes at tube powers higher than those previously experienced at DR Reactor.

On April 12, the initial shipment of "J" slugs was made by motor truck from DR Reactor to Arco, Idaho. Shipments continued throughout the balance of the month at a scheduled rate of eight casks per week. Shipment of P-10 material from Building 105-B to Building 108-B continued during April, with 353 casks shipped.

On April 28, following the installation of activated silica feed facilities at Building 183-B, the ferric sulfate water treatment process was replaced with the alum-activated silica process for water coagulation. All areas are now using the alum-activated silica process.

The following tabulation indicates activities during April associated with special irradiations other than the P-10 program noted above, and the J-Q program as noted in the "Operating Experience" and "Improvement Experience" sections:

	Tubes Charged	Tubes Discharged	Casks Shipped
Chemical 10-66	-	1	-
Rala	-	10	3
Production Tests	20	25	25
Total	20	36	28

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B. Equipment Experience

During April, 24 scrams occurred. Nineteen of the scrams at C, D, DR, and F Reactors were caused by normal Panellit system difficulties. One scram at F Reactor resulted from an electrical power surge on the BPA system. Two scrams occurred at H Reactor, one caused by an electrical fire in No. 22 vertical rod switch in the control room, and one as the result of malfunctioning of the Foxboro temperature monitoring instrument on recirculation tube 0961-H (PT-105-506-E, "Recirculation Studies"). One scram at C Reactor occurred as a result of improper by-passing of the B-C Reactor inter-tie while making revisions to the B Reactor portion of the inter-tie. One low pressure scram occurred at D Reactor on water quality tube 2170-D (PT-105-525-E, "The Effects of Water Quality on Pile Operation") when the supply pump failed causing a momentary drop in pressure. Total outage time charged to these scrams was 8.0 hours.

Extensive work related to horizontal rods continued during April. During a gas leak testing program at B Reactor on April 29, horizontal rod thimbles Nos. A, B, 4 and 7 were found to be leaking. Rods Nos. 4 and 7 were removed from service and the thimbles blanked off pending repairs scheduled for the next outage. At that time, blanking off of A and/or B thimbles for subsequent replacement is planned. Other horizontal rod work during April, necessary because of thimble leaks, included removal and replacement of No. 6 thimble at B Reactor, and removal from service of No. 5 rod at DR Reactor with blanking off of the thimble.

At C Reactor, vertical rod No. 21 was returned to service following removal of two sections of stainless steel tubing dropped into the channel during the removal of the KAPL 114 facility in December, 1953.

During April, there was one Building 190 process water pump motor failure, No. 1 (800 hp) motor at F Area. The motor required complete rewinding, and was replaced immediately.

One process tube leak occurred in April at C Reactor in conjunction with a rupture in process tube 2878-C. During operation subsequent to the replacement of the tube, approximately 285 gallons of water were removed from the reactor. At month end, consideration was being given to the shutting down of F Reactor to test for a tube leak on the basis of increasing abnormal water collection rates as high as 20 gallons per day for a total of 83 gallons during the period April 26 through 30.

Replacement of rear face neoprene pigtails because of blistering continued during April at C Reactor. Eighteen were replaced in April as compared to one in March and 12 in February.

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B. Equipment Experience (Continued)

Further investigation of the leak in the north 107-D basin reported last month indicated a leakage rate of 30 to 40 gallons per hour only when the water in the basin is cold. In view of this fact and a shortage of repair materials, the basin was returned to service with no repairs planned in the near future.

At F Reactor, the lower "lip" of all the discharge chute liners has curled to the extent that metal collects in the chutes and causes jams. Studies are in progress to determine the best method of correcting the situation.

C. Improvement Experience

The most significant Production, Development, and Process Tests are reported below, together with other items of "Improvement" significance.

PT-105-506-E	(Recirculation Studies) Following three days of low pressure operation of recirculation tube 0961-H on process water because of temperature instrumentation difficulties, extensive modification to flow instrumentation, and temporary repairs to temperature instrumentation were made during the H Reactor April 21 outage. Recirculation at high pressure was resumed following the outage. April outage time resulting from this test, 0.3 hour.
PT-105-517-E Suppl.A	(100 Areas Filter Plant Tests) High filtration rates of 7,000 gpm per filter-basin unit or 6.1 gpm per sq. ft. continued at 100-D Area throughout April. The short filter runs, which have been as low as four hours, have caused concern. Consequently, future efforts will be directed toward improving the length of filter runs.
PT-105-531-A	(Enrichment at H-Pile) This test was terminated during April, and the enrichment program will be continued as specified by Process Standards. Fifty-three tubes of "C" enrichment remained charged at H Reactor.
PT-105-529-E	(Increasing Power Levels at H Pile by Raising Permissible Exit Water Temperature)
PT-105-530-E	(Full Pile Burnout Experiment)
PT-MR-105-12 Suppl.A	(Operation of H Reactor with Maximum Protection from the Panellit System)

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C. Improvement Experience (Continued)

PT-105-567-A (Preliminary Irradiation of J-Q Columns)
H Reactor was limited in April by exit water temperature limits as permitted by PT-105-529-E, and by graphite temperature limits within the J-Q loading. The helium concentrations up to 50 percent permitted by PT-105-567-A resulted in increased production in the 1000 tubes outside the fifteenth lattice unit, and yielded a net increase of 24 megawatts in the established maximum operating level.

PT-105-562-A (Slug Evaluation at Increased Irradiation Levels for Tritium Production)
The irradiation of the 130 tubes of P-10 material (60 tubes charged under this test in the central zone in February and 70 tubes charged in the fringe zones in March as the first installment of a full reactor loading) continued without incident at C Reactor. One tube of the test material was discharged in April in accordance with the test for examination of the slugs, all of which were in good condition and showed no deleterious effects after two months of irradiation at power levels higher than previously experienced at DR Reactor.

PT-105-532-A-4 (Irradiation of Enriched Uranium Slugs)
An "E" slug rupture occurred in tube 2774-C at C Reactor on April 12. To avoid the possibility of additional "E" ruptures, the two remaining tubes containing slugs of this type were discharged, completing irradiation of metal under this test. Outage time resulting from the rupture was 31.0 hours.

PT-105-531-E (Full Pile Distortion and Annealing Experiment)
This test was discontinued at D Reactor during April, and the reactor will operate under Process Standards with respect to graphite temperatures. By agreement with the Pile Technology Sub-Section, the 95 C exit water temperature authorized by the test will be retained until new specifications for increased exit water temperatures are issued.

Four revised Process Standards - Reactor were approved and issued during April. These were standards titled "Horizontal Rod Cooling Water," "Reactor Atmosphere - Pressure and Flow," "Unirradiated Metal Slug Inspection and Storage," and "Vertical Safety Rod Withdrawal." The most significant change involved the limiting of the rate of vertical

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C. Improvement Experience (Continued)

rod withdrawal during cold start-ups to a rate which will preclude the possibility of attaining dangerously rapid power surges. In addition, a waiting period between a scram and the initial vertical rod withdrawal for recovery has been specified to insure that the reactor will be sub-critical when the vertical rods are all withdrawn and the horizontal rods are still in.

Personnel in the Reactor Section engaged in work which might be expected to result in inventions or discoveries have reported that no inventions or discoveries were made during the period recovered by this report.

D. Events Influencing Cost

During April, 18 utility operators were transferred to the Operations Sub-Section from the Metal Preparation Section for the staffing of the K Reactors. The costs for these men will be charged to the K Reactor start-up account.

Principally as a result of the shorter month, Power Sub-Section essential materials costs decreased approximately $3,700 in April as compared to March.

Although plutonium output production was 3.4 percent lower in April than in March, the plutonium irradiation unit cost is expected to be approximately five percent lower in April than in March, primarily because of a large reduction ($57,000) in charges for venturi installations. Total irradiation unit cost, including charges to the P-10 program, is expected to be approximately six percent lower in April than in March.

E. Plant Development and Expansion

1. Project Status

The most significant Reactor Section project activity is reported below. Further details concerning projects may be found in the report, "Status of Reactor Section Projects, Informal Requests and Budget Items," F. A. R. Stainken to J. H. Warren, dated April 20, 1954.

CA-431 (100-C Plant)
Work was resumed on items of completion on this project following authorization on April 7, of the required funds ($228,000) by the A.E.C. Work orders were issued on all remaining items of work, and a project physical completion notice was submitted to the A.E.C. by May 1, 1954 as scheduled. Work on the baffles of the east 107-C basin was postponed during April since a portion of the B Reactor effluent flow was directed to this tank during the month to relieve the effluent vapor problem in Building 105-B.

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1. Project Status (Continued)

CA-512 (100-K Facilities)
Construction of KW and KE Reactors was 72 and 57 percent complete, respectively, at month end. KW and KE Water Plants were 88 and 60 percent complete. At KW Reactor, erection of the top shield, and installation of front and rear crossheaders and other process water piping is in progress. At KE Reactor, stacking of graphite is expected to begin about May 10. A seven-day endurance test of No. 3 process pump set at Building 190-KW was conducted April 8 through 15. During the test, foaming of the lubricating oil occurred. Investigation of the problem continues along the line of an anti-foaming agent as suggested by the vendor.

CG-558 (Reactor Plant Modification for Increased Production)
The Project Proposal (HW-30205) for this project, which currently requests $9,500,000 for procurement and design funds, had not been approved by the A.E.C. at month end. Scope design of the project remained approximately 57 percent complete at month end. The Reactor Section is reviewing the project from the aspect of potential gains in view of the current increased rupture rates being experienced.

RDS-D-10) (Reactor and Water Plant Design Development)
RDS-D-11) The direction of reactor development has been substantially modified, and the number of Engineering Department personnel assigned to this work reduced. The development effort previously devoted to the refinement of a specific design for a high level reactor is now being directed to (a) the development of complete information on the economic potentialities of a high level reactor, (b) the development of cost information associated with the incentives due to alternative design bases, and (c) the development of mechanical components and materials for application to future reactors.

CG-523 (Installation of Automatic Valves in Export Water Lines-100-B, D, and F)
The Groves valve was installed at D Reactor, and the Groves valve annunciator panel was installed at B Reactor during April. This completes the project, except for the installation of the annunciator panel at F Reactor and a minor amount of touch-up painting, and all reactors are now operating with automatic valves on the export water line in service. Groves valves provide automatic control of the export water line as a safety measure, whereas previously manual control of valves was necessary.

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2. Plant Engineering

A number of engineering and development studies were active in the Section during April. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in documents HW-31704 and HW-31711. Several items of interest are reported below.

Work on the 100 Areas Coal Utilization Standards study consisted of preparing a procedure for investigating actual burning conditions in the boilers. This procedure involves simultaneous photographing of the fire bed, pyrometric survey of furnace temperatures, and screen analysis of the coal. Other pertinent data, including stack gas analyses, will be obtained.

Progress in the sound level study to date is covered in a report, HW-31657, being issued at month end. The report consists primarily of a series of curves which show sound intensity plotted against octive band frequency, and gives a picture of noise conditions at various locations. Work is continuing to develop methods of sound attenuation at the various locations.

Study of the Building 105-B effluent system venting problem continued, and recommendations for a venting method were made to the Operations Sub-Section. Additional details are described in the "Radiation Experience" section.

Results of analyses of process dummy contaminants, which indicated that over 50 percent of the gamma component of total activity was the result of fission products, have pointed to the need for a fission product solvent such as nitric acid to aid in dummy recovery. During April, Process Sub-Section personnel conducted tests using a five percent solution of nitric acid at 60 C. An 88 percent recovery of perforated aluminum dummies resulted, as compared with an approximate 80 percent recovery using current methods. This represents reuse of approximately 40 percent of dummies currently discarded.

A study was started in April by the Process Sub-Section to determine the relative and absolute gains in production which could be achieved by various degrees of enrichment of the reactors, and/or by increasing process pump pressures above the present limits.

F. Significant Reports

1. Routine

Monthly operating reports issued for March were:

HW-31267-A	Reactor Section	JH Warren	4-1-54
HW-31434	Operating Sub-Section	RO Mehann	4-1-54
HW-31274	Process Sub-Section	OC Schroeder	4-1-54
HW-31272	Plant Engineering Sub-Section	FAR Stainken	4-1-54

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1. Routine (Continued)

HW-31349	Radiation Monitoring Sub-Section	PC Jerman	4-16-54
--	Maintenance Sub-Section	EE Weyerts	4-6-54
--	Power Sub-Section	JC McLaughlin	4-5-54

Other routine reports issued during April included:

HW-31579	"Monthly Progress Report, Reactor Section Expansion, April, 1954"	HT Wells	4-23-54
--	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	FAR Stainken	4-20-54
--	"Reactor Section Process and Cost Improvement Report - January to March, 1954"	JH Warren	4-2-54
HW-31292	"Reactivity Balance and Associated Data - Period February and March, 1954"	AP Vinther	4-1-54

2. Non-Routine

HW-31223	"Moisture Monitoring System for Detection of Leaking Process Tubes - 100-B, D, DR, F, and H"	RJ Bursey	3-23-54
HW-31301	"Moisture Monitoring System for Detection of Leaking Process Tubes - 100-C"	RJ Bursey	3-23-54
HW-31466	"Meeting Minutes - Expedition of Installation of Effluent Water Monitoring Improvements - Project 578"	HA Zwiefel	4-14-54
HW-31561	"Reactor Requirements for Proposed 3X Program"	RJ Bursey	4-20-54
HW-31657	"Preliminary Report - 100 Area Noise Study"	HC Lee	4-26-54
HW-30181	"Production Test 105-4-MR, Supplement B, Evaluation of Poison Column Control Facility"	GH Dyer-- JE Robb	2-18-54
HW-31228	"Operational Difficulties with the B Reactor Poison Column Control Facility"	RD Schilling	3-24-54
HW-31502	"Spike Enrichment with Full Reactor P-10 Loadings"	RE McGrath	4-16-54
HW-31518	"The Redistribution of Heat Generation in Reactor Process Tubes"	RE McGrath	4-19-54
HW-31520	"Production Gains Resulting from the Use of the Poison Column Control Facility on B Reactor, July 1953 through April 1954"	CW Botsford	4-23-54
HW-31541	"Pre-Shipment J-Cask Test"	RL Turner	4-19-54
HW-31553	"B Reactor Orificing Analysis"	KW Hess	4-21-54
HW-31555	"Irradiating Bismuth Slugs in Flattening Columns as a Method of Polonium Production"	GF Owsley	4-21-54
HW-31519	"Process Test MR-105-19, Evaluation of the Slip Joint of the C Reactor Rear Pigtail Replacement"	RD Schilling	4-20-54
--	"Comparative Burning Checks of FY 1954 Coal Contracts"	GW Wells	4-16-54

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III. PERSONNEL

A. Organization

There were no appointments made in the Reactor Section during April.

Effective April 1, a change was made in the Power Sub-Section organization whereby the positions of Operating Supervisor (Power House) and Power Maintenance Engineer were combined into the position, Power Engineer. The four people thus made available will be used in staffing Power Sub-Section facilities in 100-K Area.

B. Force Summary

	Beginning of Month	End of Month	Net Change
Section General	3	3	0
Operations	273	291	18
Maintenance	487	487	0
Plant Engineering	32	32	0
Power	422	424	2
Process	41	42	1
Radiation Monitoring	62	64	2
Section Total	1320	1343	23

Changes during April consisted of 4 terminations, 4 deactivations, 3 reactivations, 2 transfers out and 30 transfers into the Section. The Operations Sub-Section force increase is to provide manpower for operation of 100-K Area facilities.

C. Safety Experience

There were no Major Injuries in the Reactor Section during April. One Sub-Major Injury and one Near-Serious Accident occurred. The Sub-Major Injury, No. 255, occurred at Building 185-B on April 23 when a Power operator sustained a simple fracture of the left great toe as a result of tripping the lowering mechanism of a manually operated hydraulic lift truck. This allowed a pallet of bagged sodium dichromate to settle on his foot.

A Near-Serious Accident occurred on April 5 in the cubicle room of Building 183-B when a journeyman electrician, while making a connection to a bus, allowed his left arm to come in contact with an energized connection on top of the disconnect switch. The main breaker that de-energized the buses had been locked and tagged, but a portion of the circuit within the cubicle remained energized. The electrician was revived by means of artificial respiration, and taken to Kadlec Hospital from where he was released later in the day after observation.

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III. PERSONNEL (Continued)

D. Radiation Experience

One Class I Radiation Incident and one potential Radiation Incident occurred during April. In addition, one Class I Radiation Incident which occurred in March was investigated. Class I Radiation Incident No. 357 occurred at H Reactor when persons unknown moved a process tube cutter from a SWP zone in a corridor into the tool dolly room. A survey of the cutter prior to the incident resulted in readings of 100 rads/hr including 2 r/hr. Estimates of the potential exposures which may have been received during the moving of the cutter under the worst possible conditions indicated a maximum of 280 mrads. The investigation of this incident is contained in document HW-31631.

Investigation of the March incident in which the east quadrant of 100-B Area was contaminated by wind-blown radioactive material from the dry east 107-C effluent tank, resulted in classification of the incident as Class I Radiation Incident No. 352. It was recommended in the investigation that when an effluent basin is drained in the future the walls and bottom of the basin should be kept wet. Methods for doing this are being investigated. The investigation of this incident is contained in document HW-31565.

A potential Radiation Incident occurred at F Reactor when a pile operator attempted to move a wrapped process tube channel broach from the cushion chamber corridor to the wash pad. As the broach was picked up, it slipped out of the wrapping and struck the floor, dislodging contamination which became air-borne as a result of strong ventilation drafts in the corridor. The operator received skin contamination of 40,000 c/m on the side of the nose and 1,500 c/m in the left eye and ear. Operators on the five and 30-foot level landings also received minor skin contamination. Final classification and additional investigation await urinalysis results.

The effluent vapor problem at B Reactor, which has been magnified by the larger flow permitted by the installation of venturis, continued during April. Removal of the baffle in the effluent line did not aid in solving the problem. Pending installation of a vapor vent line at B Reactor, a portion of the B Reactor effluent flow will be directed to one of the 107-C tanks through one of the C Reactor effluent lines.

At H Reactor, following the removal of a process tube containing a ruptured regular uranium slug, dose rates as high as 350 mrads/hr were observed at the surface of the storage basin as a result of gas escaping from the slug. As far as is known, this is the first case of gas evolution from a ruptured regular uranium slug. Future

[redacted]

D. Radiation Experience (Continued)

ruptures will be studied to secure additional information on this problem.

E. Personnel Activities

At month end, seven employees are receiving on-the-job training for engineering or supervisory assignments in the Section; five of these are on assignment under the rotational training program.

Principle items of interest during April in regard to employee communications were the showing of the film "Operation Ivy" for Maintenance and other Sub-Section employees on April 12 and 13, a series of information meetings for Reactor Section supervision in each of the 100 Areas conducted by W. A. McAdams of the Radiological Sciences Department who presented statistics on trends in radiation exposure, and an evening information meeting for exempt employees of the Radiation Monitoring Sub-Section to present and discuss the Inspectors' Union Agreement. In addition, the first of a series of meetings to train electricians in the use of the arm-lift method of artificial respiration was conducted in 100-H Area.

R. L. Weston of the Separations Section reported to the Reactor Section April 5 on a loan basis to conduct a program of disaster training in the 100 Areas.

F. A. R. Stainken, Superintendent, Plant Engineering Sub-Section, attended the Industrial Acoustics Course conducted by Dr. R. O. Fehr in Schenectady on April 14 through April 16.

H. A. Kramer, of the Maintenance Sub-Section, attended the meeting of the Columbia Basin Forecast Committee in Portland, Oregon on April 16, and the Western Snow Conference in Salt Lake City, on April 19 through April 21.

J. D. McCullough, of the Plant Engineering Sub-Section, visited Panellit Incorporated of Chicago, Illinois, Weston Instrument Company of Newark, New Jersey, and Bristol Instrument Company of Waterbury, Connecticut during the period April 15 through April 27 to discuss instrumentation problems relative to process tube temperature monitors for the K Reactors.

P. C. Jerman, Superintendent, Radiation Monitoring Sub-Section, is visiting Oak Ridge, Savannah River Works, KAPL, Mound Laboratory, and Arco during the period April 26 through May 7, to gain information concerning radiation protection at these sites.

O. C. Schroeder and R. E. McGrath, of the Process Sub-Section, are visiting Arco, Savannah Works, KAPL, and the ANP project during the period April 26 through May 5, to discuss mutual reactor problems.

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May 11, 1954

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
APRIL, 1954

I. RESPONSIBILITY

Responsibilities of the Separations Section were unchanged during the month of April.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	April		March	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	12	2	55	2
Charges completed in Conc. Bldgs.	3	4	66	0
Special charges - Conc. Bldg.	22		21	
Charges completed-IsolationBldg.	207	4	359	0
Average Waste Losses, %	6.1*		2.18	
Special charges-Isolation Bldg.	59		49	
Material balance, %	190.7*		96.93	
Yield through Process, %	184.6*		94.75	
Average cooling time (days)	98		96	
Minimum cooling time (days)	81		82	

*Distorted figures due to acid washes for cleanout of building for changeover from high to low MWD material.

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1. Statistics (Continued)

b. Redox Operations

	April	March
Equivalent charges started	230	246
Charges completed	224	252
Tons Uranium delivered to storage	135.1	185.6
Average Production Rate per operating day, Tons	6.46	7.26
Average Daily Operating Rate for the month, Tons	4.50	5.99
Average yield, %		
Uranium	98.4	100.7
Plutonium	100.6	101.8
Total Waste Loss, %		
Uranium	0.88	0.81
Plutonium	0.53	0.69
Average cooling time, days	85	85
Minimum cooling time, days	75	71
Percent down time	30	17.6

c. 234-5 Operations

	April	March
Batches completed through Task II	222	314
Runs completed through Task III	131	205
Reduction yield, RM	98.0	97.0
Waste Disposal, units	3.25	8.68

d. UO_3 Operations

	April	March	To Date
Uranium drummed, Tons	419	376	5764
Uranium shipped, Tons	417	360	5705
Average cooling time, days (Redox)	96	93	
Minimum cooling time, days (Redox)	88	89	
Waste loss, %	0.03	0.13	

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e. TBP Operations

	April	March	To Date
Tons received from Metal Removal	303	226	3426
Tons shipped to UO_3 Plant	301	222	3290
Average Production Rate per operating day, Tons	11.03	7.43	
Average Daily Operating Rate for the month, Tons	10.03	7.18	

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e. TBP Operations (Continued)

	April	March
Average yield, T	98.52	96.81
Total Waste Loss, %	0.81	1.65
Ratio Waste Volume returned to Volume removed	1.03	1.00
Percent Down Time	9.0	3.39

f. P-10 Operations

	April	March

g. Power

	200 East	200 West
Raw water pumped, gpm	1 245	6 255
Filtered water pumped, gpm	423	1 017
Steam generated, lbs/hr	42 896	195 516
Maximum steam generated, lbs/hr	60 000	265 000
Total steam generated, M lbs.	31 071	140 772
Coal consumed, tons (est.)	1 953	8 523

h. Waste Storage

	Equivalent Tons U	
	April	March
Metal Waste reserve storage capacity - T Plant	700	710
1st Cycle reserve storage capacity - T Plant	148	76
Metal Waste reserve storage capacity - B Plant	145	145
1st Cycle reserve storage capacity - B Plant	4	4
Redox Waste reserve storage capacity	198	296

2. Activities

a. Redox Processing

The Redox Plant shutdown for crane decontamination and maintenance, which began on March 29, was concluded on April 8 at which time

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a. Redox Processing (Continued)

the extraction batteries were started at a 5 tons per day rate.

The feed rate was increased to 7 tons per day on April 9 and operations continued until April 19 when plugging in a waste transfer jet necessitated a reduction to 5 tons per day. The extraction batteries were shutdown on April 20 for 15 hours to replace the centrifuge feed tank agitator. Start-up was effected on April 21 and operations continued at rates varying from 5 to 7 tons per day until April 29 when failure of the 1A column feed valve forced operations to be suspended until late on April 30 for replacement of the feed valve.

b. TBP Processing

In the TBP Plant, a new production record was established as 302 tons of uranium were processed despite significant down time experienced in both extraction lines due to equipment failures in the feed preparation and waste concentration sections. Maximum production rates of 15-1/2 tons per day were attained and total production from the plant averaged approximately 10 tons per day for the entire month of April.

c. UO_3 Processing

Production through the UO_3 Plant was a new record as 420 tons of uranium were processed. Four calcinations were conducted in one of the newly installed gas fired furnaces (Luckey Pot No. 20). The initial calcinations produced powder possessing good physical characteristics but low reactivity. Temperature and feed concentration adjustments for later calcinations produced powder of acceptable quality.

d. Waste Metal Removal

Waste metal removal rates were very satisfactory with no major equipment difficulties being experienced. The principal producers were the BX and TX Farms with sludge removal activities primarily centered in Tanks 101-BX and 101-TX.

e. T Plant Processing

In T Plant, operations in the first half of April were directed toward clean-out and maintenance activities in preparation for processing 215 MWD material. The first of this material was charged on April 17 and processing started on April 22. Failure of the concentration building D-1 tank on April 26 forced suspension of operations until April 28 when the D-1 tank was replaced and vessel flushings were completed. The first batch of low MWD material was transferred from the canyon to the Concentration Building on April 30.

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f. Isolation and Metal Fabrication Processing

Isolation operations were normal with no unusual processing or equipment difficulties being experienced. Cell 4 was removed from production in April and all process vessels and equipment were thoroughly flushed in preparation for receiving 215 MWD material during the month of May. Fifteen recycle cans were segregated for exclusive use in the processing of 215 MWD material from T Plant. At the end of the month, all recycle material from Cells 2 and 3 was being sent to the Redox Plant for reprocessing.

In the Metal Fabrication Building, 99% of the production commitment for unfabricated buttons and 110% of the commitment for final shapes were produced. By pre-heating the process gases and operating the Task II furnaces at a reduced temperature of 450° C, the re-hydrofluorination rate was reduced to a record low of three percent.

g. P-10 Processing

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3. Special Operations

a. Waste Evaporators

April operating data for the 242-B and 242-T waste evaporators are as follows:

Evaporator	Gallons Feed	Gallons Bottoms	Gallons Condensate	% Volume Reduction
242-B	295 625	192 500	103 125	34.9
242-T	322 000	225 342	96 658	30.0

b. Pu Recovery, 234-5

The equivalent of 21.7 bottles of product was processed in Metal Recovery (Hood 40), the equivalent of 5.8 bottles was processed in Powder Recovery (Hood 41), and the equivalent of 34.8 bottles of material was transferred to the Concentration and Isolation Buildings for reprocessing.

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B. Equipment Experience

1. Operating Continuity

Redox down time totalled 218 hours and was primarily for crane decontamination and maintenance. Replacing the G-5 agitator and 1A column feed valve also contributed to the total down time.

Total down time for the TBP Plant was 110 hours for A Line and 19.5 hours for B Line. The outages were caused by failure of the condenser vent blower motor, two waste concentrator pumps, and the A Line RA column feed pump.

2. Inspection, Maintenance, and Replacement

a. 60 Ton Crane - Redox

Decontamination and major maintenance repairs of the Redox crane were accomplished during the plant shutdown of April 1 - 8. Repairs included replacement of the main hoist motor generator set and trolley festoon cables; installation of a new vent duct and cab filter system; repair of the left hand optics system.

b. 1A Column Feed Valve Failure - Redox

A ruptured 1A feed valve bellows forced building shutdown on April 29. The valve was replaced with a redesigned inverted seal type valve which is expected to give better service and eliminate the possibility of similar failure.

c. D-1 Precipitator Tank Failure - T Plant

The lanthanum fluoride by-product precipitator tank (D-1) in the Concentration Building developed a bottom leak on April 26. Replacement was made with the A-1 tank from the B Plant Concentration Building. The D-1 tank had been in service since start-up, and was the first lanthanum fluoride process tank in either B or T Plant to fail.

d. RA Column Feed Pump Failure - TBP

The A Line RA column feed pump failed on April 12 and replacement was made with a spare unit on April 14. High radiation levels have prevented inspection of the unit to determine cause of failure.

e. Waste Pump Failure - TBP

Both waste transfer pumps in the WR-001 Tank (waste pump tank to East and West Area Tank Farms) failed within a period of one week. Bearing failure resulted in locked impellers. Replacements were made and subsequent operations have been satisfactory.

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2. Inspection, Maintenance, and Replacement (Continued)

f. Nitric Acid Fractionator, TD-4 - UO_3

An inspection of plates nine and eleven of the TD-4 nitric acid fractionator revealed corrosion which had affected plate leak rates such that plate nine leaks at 14 gpm and plate eleven leaks at 4 gpm. Since the present reflux is 4 to 5 gpm it can be assumed that plates nine, ten, and eleven are ineffective for nitric acid concentration. It was reported previously that the lower section of eight plates had also failed due to corrosion. Six effective plates remain in the unit.

g. Filter Stick Failure - 231

Inspection of the catch tank filter sticks revealed complete corrosion of the filter media, and replacement was made with spare units. A newly designed filter stick employing Kel-F plastic material as the filter media has since been fabricated for test purposes. Previous experiments with this material indicated that it was not subject to corrosion and with better mechanical mounting would probably result in a much more serviceable filter stick.

h. Filter Replacement - 234-5

Replacement of the primary CWS filters with the new fire-proof type filter on the RG Line, RMA Line and primary filter boxes, including those of the Analytical and Technical Laboratories, was completed during the month.

C. Improvement Experience

1. Process Tests and Revisions

a. Dissolver Operation - Redox

The discharge of ruthenium contaminated ammonium nitrate, formed during simultaneous operation of the Redox dissolvers, from the Redox stack has been the principal contributor to the particle problem at Redox. Institution on April 24 of an over-all schedule for coating removal, metal dissolution and solution storage and blending permits complete segregation of the coating removal and dissolution steps, thus minimizing the major cause of ammonium nitrate formation at the expense, however, of reducing dissolver output. This problem is currently being studied in view of future production requirements.

Emission of I^{131} from the Redox stack has been aggravated recently by the relatively short silver reactor life and by the inability to obtain conclusive indications, via the continuous stack monitor, of which reactor is failing to remove iodine effectively.

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a. Dissolver Operations - Redox (Continued)

Facilities have been installed in the sample gallery to permit caustic scrubber sampling of the individual off-gas streams downstream from the reactor. Iodine analyses of these samples permits determination of which reactor is in need of regeneration.

b. Metal Feed Preparation - Redox

Revisions of the head-end feed preparation procedure to provide ample reflux before the addition of permanganate, and an increase in the permanganate temperature have been instrumental in lowering ruthenium emission to below one-half curie per batch of feed oxidized. Data from the recently installed strip filter have also permitted curtailment of reflux during the latter portion of the oxidation, consequently shortening the time cycle by nearly three hours.

c. Recycle Processing - Redox

Completion of the recycle addition facilities has permitted addition of Isolation and Metal Fabrication Buildings recycle to the Redox process. Recycle from the Isolation Building is now being received on a current basis without noticeable effects on the process and testing of various types of recycle from the Metal Fabrication Building is in progress.

d. Heated RC Column Extractant - TBP

Employing RC Column extractant heated to 55 ± 5° C was continued in April. Analysis of the RC Column waste losses versus RC Column aqueous to organic ratio has indicated that the extractant flow reduced to 50% of normal flowsheet requirements is a practical limitation. The control aqueous to organic ratio as determined from plant data was 0.65 and was further substantiated by a 0.60 value obtained from laboratory equilibrium data. The process is now set at a RC column aqueous to organic ratio of 0.70 to allow for fluctuations in flow rates and temperatures.

e. Reactivity Process Test - UO_3

One carload of uranium oxide has been produced incorporating sulfamic acid as an additive to improve the oxide reactivity. Previous attempts to produce large quantities of this type oxide had resulted in severe product caking in the calcination furnaces. Reduction of the agitator work load by decreasing the furnace charge eliminated essentially all of the caking problem. A reactivity of 1.30 and a percent UF_4 conversion of 89.51 were achieved for the carload shipment.

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1. Process Tests and Revisions (Continued)

f. Gas Fired Furnace Test, Luckey Pot #20 - UO_3

Four calcinations were conducted in Luckey Pot #20. Powder produced by the first two calcinations contained an excess of free nitric acid and water, and gave a test for reactivity which was below specification. Increasing the calcination temperature and the uranium concentration of the feed resolved the difficulties and resulted in acceptable powder being produced in the latter two test calcinations.

g. 215 MWD Material Processing - T Plant, and Isolation Building

In preparation for starting the 215 MWD program in T Plant, the Canyon Building equipment was completely flushed and cleaned of plutonium heels by processing eight acid washes through the building. Product recovery approximated 324% of a standard run and partial flushing of the Concentration Building equipment recovered 6.15% of a standard run.

Cell 4 of the Isolation Building is also being flushed and cleaned of plutonium heels prior to inauguration of the 215 MWD program, but because of continued T Plant receipts, the cleaning program is only about 80% complete.

Initial shipments of the 215 MWD uranium were received in the Canyon Building on April 17 and eleven plutonium batches were started during the month. Runs processed to date confirmed the opinion that the dissolving and extraction sections would determine the production capacity of the Bismuth Phosphate Plant under the 215 MWD program. The present equipment is being modified to give maximum flexibility in these two sections, and process changes are being investigated to give the minimum time cycle for processing.

h. Task II Re-hydrofluorination Rate - 234-5

In April, 186 runs were processed through Task II to the inspection station. Only five runs were re-hydrofluorinated, of which two were caused by equipment difficulties. Excluding these two runs, the re-hydrofluorination rate is 1.6% and over-all it is 2.7%. This is the lowest re-hydrofluorination rate ever achieved on the RMA Line under routine operating conditions and is attributed to preheated process gases, a 450° C maximum cycle, and the excellent condition of Task II equipment which has resulted from a coordinated preventive maintenance program.

2. Inventions or Discoveries

Personnel in the Separations Section engaged in work which might be expected to result in inventions or discoveries have reported that no inventions or discoveries were made during the period covered by this report.

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D. Events Influencing Costs

Total operating costs for the Section are expected to be approximately five percent lower than in March. New production records were established in the TBP and UO_3 facilities and resulted in increased total costs; however, this was offset by the decrease in production and total costs in the Bismuth Phosphate and Redox facilities.

Total force of the Separations Section showed a net increase of six. Four operators were added by Operations, five craftsmen were added by Power and Maintenance, and three secretaries were removed from the payroll by Process.

E. Plant Development and Expansion

1. Project Status

a. Project CG-496, Recuplex Installation, 234-5

Construction efforts were limited to erection of vessel supports and mezzanine, installation of ventilation piping, and installation of instrument-control hoods. Vessel-procurement delays continue and the AEC is expediting delivery of this equipment.

b. Project CG-535,Redox Expansion, Phase II

Inspection of the 1A column at the vendor's plant revealed dimensional errors on the location of some nozzles. Required changes will result in a one-week delay to column delivery schedule, and complete delivery of columns is now scheduled for June 14. Fabrication of supporting equipment by Minor Construction is scheduled to be complete by May 28. Material and connector heads are again available for jumper fabrication and a realistic date for completion of this work is June 25. Some columns and equipment will have been replaced by this date, but final elements of the Stage I group cannot be installed until approximately July 1, 1954. The need for replacement of the process waste concentrator (D-12) would seriously prolong the shutdown. Major efforts are being directed at bettering the foregoing schedule inasmuch as it is now in serious conflict with the production demands placed upon Redox.

Construction of the 233-S concentration building is on schedule, with ready-for-operation date remaining at December 1, 1954.

The ANN storage tank has arrived on site and will be soon installed in the 211 Tank Farm.

c. Project CA-539, Additional Redox Waste Storage, 241-SX

Construction, at 92%, is 2% behind schedule. The ready-for-operation date is May 7, 1954, with physical completion July 1, 1954. Due to

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1. Project Status (Continued)

c. Project CA-539, Additional Redox Waste Storage, 241-SX (Cont'd)

procurement difficulties, instrument work in the condenser house will not be complete by May 7, 1954 however, this will not delay the ready-for-operation date.

d. Project CA-513-A, Purex

Purex design is 98.5% complete compared with a scheduled 100%. Construction of Part A as of April 15 is 30.5% complete and is essentially on schedule. The estimated ready-for-operation date continues to be August 1, 1955; however, this may require changing to a more optimistic date in the near future if the construction contractor continues to stay on schedule. The official scheduled date for construction completion is still January 1, 1955.

A revision request to increase the condensing capacity of the 241-A tank farm and to make other alterations to take care of "burping" was approved by the Project Representatives and the Design Council. The AEC has not yet approved this revision. To achieve the required condensing capacity of 75,000,000 Btu/hr., the surface condensers as presently designed are to be cancelled and replaced by a direct buried contact condenser and an installed spare. Capacity for condensing the vapors from the waste storage tanks will thus be increased by approximately five times.

A revision request was recently approved by the Design Council to co-ordinate the execution of construction work of Project CA-513-A and CG-558 and to minimize duplication of work as well as eliminate work no longer necessary. The work involved installation of additional pumping capacity in the 181-B and 181-D pump houses to provide adequate raw water to the 200 Areas. Project CG-558 will install a number of pumps in these pump houses, thus eliminating the need for some of the pumps which were to be installed by Project CA-513-A. More pumping capacity will be available for export line service as a result of Project CG-558. The effect of this revision will be to delay the CA-513-A phase of the work until approximately April 1, 1955.

The manual, "Introduction to Purex," is approximately 40% complete. Work on the "Information and Equipment" manual is 10% complete. Preparation of the Operability and Test Procedures Manual has been started.

e. Project CG-187-D-II, Redox Production Facility

1) Sample Gallery Ventilation Improvements: The planned completion date of July 1, 1954, is being reconsidered in light of other shop work.

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e. Project CG-187-D-II, Redox Production Facility (Continued)

2) Backcycle of 2DW and 3DW as 1A Scrub: 3DW backcycle facilities will be installed with Stage 1 of CG-535. Design of 2DW backcycle facilities has been started and its installation will be carried out after completion of Stage 1 of CG-535.

f. Project CG-187-D-III, Redox Waste Water Disposal Basin

Backfilling of the old swamp is 50% complete with approximately six week's work remaining. No contamination spread has been noted. The physical completion date is July 1, 1954.

g. Project CG-580, Redox Cell Air Cleaners

Completion of the final design is scheduled for early in May. The designs will incorporate the following revisions: (1) completely fireproofing the units, (2) providing for remote replacement of power cables, and (3) providing for remote replacement of motor fan units.

It is hoped to reduce the promised three to four months delivery time by a factor of two. The target readv-for-use date of August 1, is predicated upon the expedited delivery of these critical materials.

h. Project CG-585, Oxidizer Off-Gas Treatment, Redox

The AEC approved this project on April , 1954. The project has been split into two stages of work. Stage 1 consists of installation of the spare H-5 scrubber and a new filter in the J-2 and J-3 positions respectively. Only those jumpers needed to put the new J-3 filter in service will be included. Stage 2 will consist of the fabrication of the remaining jumpers which will allow operation of the new J-2 scrubber. Design started April 14, and a tentative design completion date of May 3 has been set for the Stage 1 portion.

2. Manufacturing Engineering

a. Standards Program

Revised methods were developed for liquidation of Process Analytical charges and for computation of associated standard costs. These new methods are expected to provide more accurate reports.

The direct labor standards for the Z Plant Instrument and Electrical groups were completed during the period. Work has begun on development of accounting methods to permit reporting performance against these standards.

2. Manufacturing Engineering (Continued)

b. Work Simplification and Cost Reduction

Four Work Simplification conferences were held this month involving 76 man hours of instruction for 19 conferees on the supervisory roll. The current program is 80% complete.

A work simplification proposal to save 590 man hours annually by those waiting for vehicle servicing in the 200 West Area was submitted to the Transportation Section.

c. Engineering Assistance

The collection of data on Separations Section vehicle utilization was completed and a report will be issued in May summarizing the findings.

The 200 West Area shop centralization study has been completed. Revision of the machine shop layout and expansion of the carpenter shop in Building 272-W, and consolidation of the process-equipment fabrication facilities in Building 277-W were recommended.

Efforts to reduce personnel contamination through the development of improved decontamination procedures and equipment in the 222-S laboratory were continued. During April, fabrication of a working model of a device to rinse, "slurp," and disassemble doorstop sample containers was completed. This device, which was demonstrated to Process Sub-Section supervision, enables the aforementioned operations to be conducted by use of remote mechanical aids, with complete personnel protection from contamination. Design and fabrication cost estimates for this installation are being obtained for the Process Sub-Section.

A program to provide temporary facilities for cleaning contaminated area vehicles was essentially completed at month end. The grease pit at the 269-W (TC) Building was selected as the most satisfactory site. Outfitting this facility consisted of providing utilities and drainage for a self-generating steam cleaner. These modifications met the requirements of the Transportation Section, who will perform the actual cleanup.

The electronic sealer currently used extensively in the Z Facilities was redesigned to afford greater safety to operating personnel. Recommendations for safe operating procedures and practices in its use were submitted to the Operations Sub-Section.

d. Property Management

The 200 Area weed control program was started in April. DuPont's CMU, a soil sterilization agent, was applied to prevent all growth within 20 feet of buildings and fences in the following areas:

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d. Property Management (Continued)

B, T, and 231 exclusion areas; the 200 East and West General Areas, and a portion of the 234-5 exclusion area. The spraying of 2-4-D for killing of Russian thistle is scheduled for early May in areas where the growth of grasses is to be encouraged.

The scoping and preliminary engineering were started on a program to install sirens in operating buildings. This was deemed necessary in order to eliminate the possibility of confusion in the signals "to evacuate" or "to take shelter." The existing Klaxons will be used for signaling an "evacuation"; and the proposed sirens, to "take shelter."

F. Significant Reports Issued

1. Routine

Number	Title	Author
HW-31737	Separations Section-Operations Sub-Section Monthly Report	V.R. Chapman
HW-31736	Separations Section-234-5 Operations Monthly Report	V.R. Chapman
Official Use Only	Separations Section-Plant Engineering Sub-Section Monthly Report	C.P. Cabell
HW-31774	Separations Section-Process Sub-Section Monthly Report	W.N. Mobley
HW-31742	Separations Section-Radiation Monitoring Sub-Section Monthly Report	A.R. Keene
Official Use Only	Separations Section-Power & Maintenance Sub-Section Monthly Report	R.T. Jessen
HW-31775	Separations Section-P-10 Extraction Unit Monthly Report	O.V. Smiset
HW-31609	Monthly Progress Report, Plant Expansion, Plant Engineering Sub-Section, Separations Section, April 1954	F.A. Hollenbach
HW-31706	Separations Section-Essential Materials	J.P. McBride
HW-31513	Separations Process Council Meeting	O.F. Beaulieu

2. Non-Routine

None	Standards Analytical Requirements, 231 Building, P.E. Report No. 109-Revised	R. H. Silletto
None	Preventive Maintenance Study, Instrument and Electrical Groups - Z Plant, P.E. Report No. 111	R.S. Himmelright
None	Process Samples and Filterboat Movement, 231 to 234-5, Work Simplification Report No.1	R.S. Himmelright
None	Servicing of Vehicles at 200 West Area Garage, Work Simplification Report No. 4	R.C. Burke

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2. Non-Routine (Continued)

Number	Title	Author
HW-31410	Radiation Incident, Class I, No. 353	D.R. Koberg
HW-31517	Radiation Incident, Class I, No. 354	J.P. Corley
HW-31608	Radiation Incident, Class I, No. 355	W.G. Westover
HW-31088	Determination of Sr^{90}, Sb^{125}, Cs^{137} and Absolute Beta Activities in First Cycle Supernatant	H.R. Helmholz
HW-31089	U^{237} Activity and Its Effect on Beta and Gamma Specification Analyses as a Function of Cooling Time	H.R. Helmholz
HW-31185	Measurement Precision in SF Material Accounting - 200 Areas	W.N. Mobley

III. PERSONNEL

A. Organization

There were no significant organizational changes in the Separations Section in April.

B. Force Summary

	Start of Month	End of Month	Net Change
General	5	5	0
Operations Sub-Section	609	613	4
Power & Maintenance Sub-Section	562	567	5
Process Sub-Section	207	204	- 3
Radiation Monitoring Sub-Section	75	75	0
Plant Engineering Sub-Section	27	27	0
P-10 Extraction Unit	39	39	0
Section Total	1524	1530	6

C. Safety Experience

One sub-major injury occurred on April 9 when a Power and Maintenance employee sustained a severe contusion to his left foot. A steel ring (diameter 32", width 8", 1/2" plate) fell from its stored position on the 8" side and struck the employee's foot above the safety cap in his shoe. As of April 30th the Section had worked 184 days without suffering a lost-time injury.

D. Radiation Experience

Three Class I radiation incidents occurred. These involved: (1) personnel exposure to airborne ruthenium contamination in the 222-S laboratory when

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D. Radiation Experience (Continued)

a non-routine sample containing ruthenium was improperly stored; (2) uncontrolled spread of contamination when a leaking connector in the 155-TX diversion box allowed metal waste to flow through the previously failed catch tank and to percolate to the surface of the ground; (3) contamination spread and possible inhalation of plutonium as a result of failure to detect contamination following use of a ruptured hood glove in the 231 Building.

A probable Class II incident involving a small localized exposure estimated to be above the permissible limit occurred on April 30 as a result of spot skin and clothing contamination during routine operations in the 222-S laboratory. The exact exposure had not been determined at month end.

Blowbacks of contamination into the Redox pipe gallery lines constituted a serious potential for personnel exposures. Five separate blowbacks occurred in April, four of which involved lines from H Cell and one involved the air line to the 1A column feed valve.

The exposure problem during pot unloading in the UO_3 Plant was significantly minimized through the use of shielding devices during the unloading operation.

E. Personnel Activities

1. G.E. Selection Program for Supervisors

Evaluation was completed for ten Power and Maintenance candidates.

2. Conference Leading Training

Six Separations Section exempt personnel completed the one day training program offered by Training and Development instructors.

3. Report Writing Course

Five exempt personnel completed training in the Report Writing Course offered by Technical Information on April 12 and 14.

4. Work Simplification Round Table

Nineteen Separations Section personnel completed 76 man hours of training in work simplification methods.

5. Instrument Training Program

An Instrument Training Program of one year duration and utilizing sixteen hours per week was started during April with 28 Section personnel enrolled.

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E. Personnel Activities (Continued)

6. Visitations

L. W. Finch attended the Pacific Northwest Quality Control Conference in Seattle on April 1 and 2.

On April 21 through 23, W. P. Nicklason attended the Time Standards Conference conducted by General Electric at the Edison Club in Schenectady.

F. A. Hollenbach visited the Savannah River Works in South Carolina and the Vitro Corporation Offices in New York from April 16 to 25 to review engineering and operating plans with DuPont personnel, and to consult on industrial television development and application.

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ENGINEERING DEPARTMENT

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TECHNICAL SECTION

The mechanical properties of irradiated uranium have been determined in a controlled production test conducted at HAPO. Uranium irradiated at 150-175° C to 310 MWD/AT and tested at room temperature more than doubled in yield strength (32,000 to 71,000 psi), lost 25 percent in ultimate tensile strength (104,000 to 76,000 psi) and was a factor of fifty less ductile (17.0 to 0.36 percent elongation) than the same material unirradiated. These data are the first of a series which will provide quantitative engineering data needed to design slugs having the lowest possible stress level in a given environment.

Thermal stresses in solid and cored externally cooled fuel elements have been analyzed using recently derived methods and presently available mechanical property data for unirradiated uranium. For 1.36 inch outer diameter fuel elements operating at 50 kw/ft in 105° C coolant temperature the maximum circumferential tensile stress of a solid fuel element is 43,800 psi. On coring the maximum stress is reduced by 19, 26, and 40 percent for core diameters of 0.272, 0.544 and 0.816 inch, respectively.

Several types of hollow slugs were tested under cyclic strain induced by a thermal gradient (using the woodsplitter). Resultant shape and dimensional changes indicated that substantial relief was obtained as a result of coring. None of the cored slugs split under the conditions used. Fabrication of hollow slugs and companion solid pieces to be irradiated under a production test is about 30 percent complete. These pieces are being made by coring half of an eight-inch beta treated uranium slug and using the remaining half as solid companion metal. Uranium plugs are being heli-arc welded into counterbored recesses in the slug ends to exclude Al-Si from the hole during lead-dip canning. An inside diameter of 0.375 inches is being used in these pieces since preliminary calculations lead to the conclusion that this size results in a maximum stress relief with a minimum loss in reactivity. These should be canned and charged into the piles during May.

Structural damage in irradiated uranium as studied by X-ray diffraction is undetected at 150 MWD/T exposure but is revealed by definite line broadening at 1000 MWD/T exposure. The exact type of structural damage has not yet been ascertained.

Studies directed toward identification of ruthenium species in Redox solution have shown that the head-end treatment almost completely destroys anionic and hexone-soluble forms but that solid ruthenium, either precipitated or absorbed on MnO_2, appears in appreciable quantities--approximately half the ruthenium in the H-1-MO solution and most of that in the ICU appears to be present as a solid. The head-end treatment is beneficial and should be retained but improvement in clarification of the H-1-MO is needed.

Scavenging treatments were carried out with stored first cycle Bismuth Phosphate waste supernate. Acidification of the sample to pH 8.5 and treatment with nickel ferrocyanide effected a cesium decontamination of 1200 and yielded a solution well below cribbing levels.

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Several hollow slugs were hot-press canned under various conditions to establish the feasibility of the process. The slugs canned satisfactorily with no gross deformation of the hole apparent upon sectioning.

Forty-six 8-inch pieces were canned during the month on the 4-unit pilot model gang press. The adequacy of the die design and the heating system was demonstrated. The mechanical performance of the 4-unit block was particularly free from operating difficulties. Fabrication of the 16-unit prototype gang press is proceeding. The unit should be ready for operation toward the end of May.

Emission from the stack of iodine and ruthenium was under control with average values of 1.8 and 0.8 curies/day, respectively. The maximum daily emission values for iodine and ruthenium of 14.4 and 3.9 are attributed to loss of vapor stream pre-heat in the case of the iodine emission and ruthenium scrubber chemical cleanout. Improved instrumentation is permitting definition of the source of ruthenium emission; measures are being studied to repress the evolution of ruthenium which occurs immediately upon addition of potassium permanganate to the oxidizer system. No pressure surges were observed at the tank farm during the month. Laboratory studies on this problem suggest that the system may be susceptible to control by regulation of the caustic concentration.

Waste metal recovery plant operations were notable for high production and low waste losses, high on-stream efficiency and high product quality which were individually the best achieved since plant start-up. Single cycle operation was adequate for processing the feed which had an average estimated age of 3.8 years. Water sluicing and supernatant acidification were successfully employed in achieving a new record uranium weekly removal rate. An experimental carload lot of uranium-trioxide was produced wherein sulfur was incorporated (0.08 wt. percent sulfamic acid addition) to produce material with the reactivity of 1.3 versus normal values in the range 1.0 to 1.1. The gas fired Luckey type pots were placed in trial operation. Other than high powder entrainment from the fume system it appears that they will be satisfactory after further investigation and definition of optimum processing conditions.

Laboratory studies of the completely acidic dissolution procedure for slugs and jackets were directed primarily at control of the hydrogen content of the out-gas stream; it appears that the presence of uranyl ion or aluminum ions will permit control of the hydrogen content in the off-gas stream.

During April, the piles were limited primarily by outlet water temperature determined by slug corrosion effects. New high levels were reached during the month at B, D, DR, and H. Increases in river water temperature caused power level reductions toward the end of the month.

Thirteen eight-inch and seven four-inch normal uranium pieces failed during the month. Four of these failures were cap failures, one was a compound cap failure, five were uranium cleavage failures, three were side failures, two were non-classified, and the other five were stuck in the tubes and have not yet been inspected. One failure of a Al-U^{235} alloy "J" piece occurred at DR Pile this month. A three-inch longitudinal split in the can wall was noted.

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The in-pile recirculation loop at H operated for thirty days with an outlet temperature of approximately 120° C. Operation is now being conducted with Al tubes and Al-jacketed slugs at 145° C. A larger deionizer and bypass heat exchanger were installed in the system to improve the purity of the water.

DESIGN SECTION

During the month direct engineering effort for the Section was distributed approximately 30% to Expansion Program activities, 13% to CG-558, Reactor Plant Modification for Increased Production, 27% to Research and Development, and 30% to other projects and design orders.

Over-all design on Reactor Plant Modification for Increased Production, Project CG-558, was advanced to 15.6% complete. Detail design was increased 4% during the month to 11% complete. Considerable effort was directed toward the preparation of an integrated design, procurement and construction schedule for the project.

Design of the Hot Semiworks Conversion, CA-513-D is 100% complete, an advance of 2% during the month. This does not include the design of the waste self-concentrator, which was advanced 30% during the month to 75% complete.

Detail design of the 300 Area Expansion, CA-514, was advanced 6% during the month to 90% complete. A change in scope to the use of water instead of steam in the autoclaves will delay design completion until about June 15, 1954.

The 3X Program was redirected on a curtailed basis toward the provision of slight modification to the existing temporary facilities to process the present load, but excludes isotopic enrichment, "hydroside"-forming or development facilities. Over-all design completion for CG-573, Hanford 3X Program - 300 Area, is 66% complete, a reduction of 18% during the month due to a scope change from hot press to dry canning.

The design completion of other major projects and design orders is as follows:

		Progress March	Total to Date
CG-549	Activate Task I, Building 234-5	4%	99%
CG-551	Expansion of Building 234-5 Facilities	3.1%	99.1%
CG-562	Waste Metal Recovery - Solvent Treatment	2%	100%

Authorization was received during the month and design was started on a priority basis on CG-585, Oxidizer Off-Gas Treatment, Redox, for the installation of an oxidizer off-gas scrubber and filter in the Redox Plant to alleviate the ruthenium contamination problem.

Hot testing of the prototype fuel element machine continued through the month. Various design developments and revisions were made to improve the reliability and operability of the machine. Plans were made for the development of a prototype in-line alpha monitor.

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PROJECT SECTION

At the end of the month, construction completion status of major projects was as follows:

Project No.	Title	Scheduled Completion	Actual Completion
CG-496	Recuplex	40%	39%
CA-512	100-K Area Facilities		
	KW - Water Plant	94	88
	Reactor & Bldg.	86	72
	KE - Water Plant	71	60
	Reactor & Bldg.	54	58
	General Facilities	86	75.7
CA-513	Purex Facility, Part "A"	36	36
	Part "D"	55	40
CA-514	300 Area Expansion	31	31
CG-535	Redox Capacity Increase, Phase II	35	29
CA-539	Redox 241-SX Tank Farm	95	92
CA-546	Fuel Element Pilot Plant	10	19
CG-573	Hanford 3X Program - 300 Area		58*

* Work now authorized, which is a portion of proposed project.

Work on Projects CG-438, Ball Third Safety System, and IR-116 (AECP-138), Combined Civil Defense and Plant Disaster Control Center, was completed during the month.

At the end of the month there were 1166 current orders for items which require inspection. One heat of 304-L plate which has been partially fabricated in the vessels for Purex has been found to have excessive inclusions of foreign material.

Power to one pump at 181-KW has been permanently connected, and the five other pumps are being connected. The six pumps at 181-KE have been set but not connected. The endurance test on No. 3 Process Pump Assembly at 190-KW was completed satisfactorily. The boilers and turbine generators in 165-KW were in final stages of installation and testing. The equipment installation at the KW Water Plant is being scheduled toward a ready-for-use status of the entire plant for August 15, 1954. At 105-KW, aggregate for the top "B" shield was prepacked, and grouting was begun. The gas leakage test has indicated losses within the minimum requirement of 60 cubic feet per hour. Because of increased difficulties with Threadolets, decision was reached on April 23 to machine those originally ordered for the rear face of 105-KE and KW to provide sufficient acceptable connectors for front face of KE. Procurement problems for 105-KW have been reduced to two items, vertical rod cylinders and horizontal rod tips. The shielding crates for 105-KE were completed, and thermal shielding was placed on the right and left sides. Other installations are being scheduled to meet the proposed packing date of May 10-12. Fabrication of process tubes for 105-KE was started the last week of April. Downcomer fabrication is nearing completion.

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During the month about 7500 cubic yards of concrete were placed in 202-A Building andrelated structures. Construction of Purex Facility has been accelerated to three full-strength shifts for mechanical phases, including the Pipe Shop. Installation of piping in the Hot Pipe Trench was started on April 14, and installation of vessels TK-104, 106, and 107 in the basement of Aqueous Make-Up was started on April 23. Of the 565 kick-plates required, 121 were placed during the month, bringing the total to about 175. The roof slabs of the 202-A Building were complete, and the built-up roofing was about 26% complete. Erection of structural steel in the Service Area was 90% complete. This erection work was delayed about two weeks to allow completion of necessary general construction. The 272-E Mock-Up Building was ready for installation of mock-up equipment as it was received. The concrete barrel of 291-A Stack was completed April 9, and preparations were made for installation of the stack liner. At Redox Capacity Increase - Phase II, construction work on the 233-S Building was continued under SWP conditions. At the Redox Tank Farm, concrete domes on the remaining nine tanks have been placed.

ORGANIZATION & PERSONNEL

Total on Roll, April 1, 1954	1,503
Accessions	27
Separations	30
Total on Roll, April 30, 1954	1,500

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

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ENGINEERING ADMINISTRATION SUB-SECTION

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During the month of April a Plant-wide inventory of classified documents was carried out. This required typing, proofreading, and mailing inventory lists to all Plant personnel holding Secret and Confidential documents. The inventory was begun on April 15 and all lists were completed and mailed within a nine-day period. 1318 individual lists were prepared for a total of 57,799 document charge-outs. At month's end all lists had been returned and were in the process of being checked.

During the month the following major contract activities were handled:

1. Special Agreement No. G-43 between General Electric and the University of Washington covering graphite drying studies was executed by the University on April 6.

2. Modification No. 8 to Special Agreement No. G-5 between General Electric and National Carbon Company covering price redetermination for the final increment of production and certain specifications covering final experimental runs was executed by National Carbon Company April 29.

3. Modification No. 3 to Consultant Agreement No. 115 between General Electric and Dr. P. E. Kendall covering an extension of time and modification of terms was executed by Dr. Kendall April 14.

4. Modification No. 3 to Consultant Agreement No. 113 between General Electric and Dr. S. T. Cantril covering an extension of time of the Agreement and modification of its terms was executed by Dr. Cantril on April 14.

5. Modification No. 3 to Consultant Agreement No. 112 between General Electric and Dr. P. E. Church covering an extension of time of the Agreement and modification of its terms was executed by Dr. Church on April 22.

6. Modification No. 2 to Consultant Agreement No. 100 between General Electric and Dr. Zay Jeffries covering an extension of the Agreement and modification of its terms was executed by Dr. Jeffries on April 30.

7. Consultant Agreement No. 121 between General Electric and Haughton Elevator Co. covering consultant services in connection with modifying the capacity of charge elevators in B, D, and F Areas was executed by the Consultant on April 13.

8. Special Agreement No. G-34 between General Electric and the Columbia Valley Credit Exchange covering collection of overdue accounts was executed by the Contractor on April 15.

9. Modification No. 3 to Consultant Agreement No. 114 between General Electric Company and Dr. M. E. Ensminger covering an extension of time of the Agreement was sent to AEC for approval April 26.

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10. Special Agreement No. G-44 between General Electric and the City of Kennewick covering the use of Government-owned chlorinator was sent to AEC for approval April 26.

11. Modification No. 1 to Special Agreement No. G-38 between General Electric and Morgan Wheeler and Co. and Hugh H. Russell covering additional appraisal services and extension of time was negotiated and prepared during April and is now being processed for execution.

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HW-31734

PILE TECHNOLOGY SUB-SECTION

MONTHLY REPORT

APRIL, 1954

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VISITORS AND BUSINESS TRIPS

T. Brill visited here from Argonne National Laboratory, Lemont, Illinois, April 5 and 6, 1954, for consultations on control systems and slug failures.

J. R. Feldmeier and G. F. Mechlin visited here from Westinghouse Atomic Power Division, Pittsburgh, Pennsylvania, April 9, 1954, to discuss measurements of temperature coefficients of pile loadings.

L. P. Bupp, P. H. Reinker, and R. B. Richards visited the Feed Material Product Center, National Lead Company, Fernald, Ohio, April 26 and 27, 1954, to inspect and discuss facilities concerning fabrication for Hanford product. On April 28 through 30, 1954, they visited the E. I. du Pont de Nemours Company, Savannah River Operations, in Aiken, South Carolina, to discuss reactor operation and control.

D. C. Pound visited Oak Ridge National Laboratory, Oak Ridge, Tennessee, April 26 and 27, 1954, to discuss automatic control systems in operation at Oak Ridge, including period trip systems. On April 28, 1954, he visited Westinghouse Atomic Power Division, Pittsburgh, Pennsylvania, to discuss rate of rise trip systems, arrange for procurement of ion chambers for sub-critical monitoring, and review their approach to safety instrumentation. He visited the General Engineering Laboratory and Knolls Atomic Power Laboratory in Schenectady, New York, on April 29 and 30, 1954, to discuss development of special ion chambers for Hanford, the design and utility of interlocks in safety systems, and review GEL and KAPL techniques in safety instrumentation.

J. H. Rector visited the Carboloy Division of the General Electric Company in Detroit, Michigan, March 26 through April 2, 1954, to discuss fabrication of boron carbide-aluminum rings.

W. C. Riley visited Battelle Memorial Institute, Columbus, Ohio, April 28 through 30, 1954, for technical conferences concerning graphite development.

J. R. Townsend visited the National Bureau of Standards in Washington, D. C., April 27 through May 1, 1954, to obtain thermal conductivity standards. He also attended the American Physical Society meeting while in Washington.

ORGANIZATION AND PERSONNEL

	March	April
Administrative	5	5
Pile Engineering	74	72
Pile Materials Development	61	62
Special Irradiations	23	23
Technical Liaison	4	4
Total	167	166

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Administrative: One Engineer II was re-assigned from the Pile Engineering Unit, one Technical Graduate transferred in from Employee and Public Relations, and one Metallurgist transferred to Technical Administration.

Pile Engineering: One Technical Graduate transferred to Project-Inspection, and one Technical Graduate - Rotational was permanently assigned to Pile Engineering.

Pile Materials Development: One Engineering Assistant 12 was reactivated from military service, and one Technical Graduate - Rotational was permanently assigned to Pile Materials Development.

PROCESS TECHNOLOGY

Power Level Limits

During April, the piles were limited primarily by outlet water temperature determined by slug corrosion effects. D and H Piles are authorized by production test to operate at 95 C and other piles at 90 C. C Pile is limited to a maximum authorized tube power. New high levels were reached during the month at B, D, DR, and H. Increases in river water temperature caused power level reductions toward the end of the month.

Slug Rupture Experience in April

Thirteen eight-inch and seven four-inch normal uranium pieces failed during the month. Four of these failures were cap failures, one was a compound cap failure, five were uranium cleavage failures, three were side failures, two were non-classified, and the other five were stuck in the tubes and have not yet been inspected. Three of the four cap failures occurred in eight-inch, lead dip canned pieces charged under Production Test 313-105-25-M. These were the first failures of this type to occur in eight-inch metal.

Of the thirteen failures of eight-inch pieces, five were Production Test 25-M metal, which failed at exposures between 500 and 600 MWD/T, and one was a lead dip canned piece charged under Production Test 313-105-7-M, which failed at an exposure of ~1200 MWD/T. Ten of the failures this month occurred at exposures above 650 MWD/T.

Irradiation Behavior of Lead Dipped Slugs - At the present time, the indicated rupture rate for Production Test 313-105-25-M metal is somewhat higher than that for eight-inch, triple dip canned slugs, perhaps by as much as a factor of two. However, there has as yet been insufficient experience with this metal to allow a firm statement as to its rupture rate. Also, it is noted that four of the five Production Test 25-M failures whose canning histories are presently known were from the Hanford cast lots which comprised approximately forty per cent of the metal charged under this test. The Hanford cast metal has, in the past, shown a rupture tendency greater than that of

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metal cast elsewhere, expecially in the contribution of cap failures. Thus the current performance of lead dip canned metal may not be representative of the over-all performance which might be experienced with this material being irradiated as standard production metal.

Failure of Non-Uranium Loadings - One failure of a Al-U^{235} alloy, "J" piece occurred at DR Pile this month. A three-inch longitudinal split in the can wall was noted. This piece had been under irradiation for approximately one and one-half months.

Higher Specific Power

Production Test 105-533-A, "Local Tube Power Increases at C Pile" - This test which provided a localized high output region for a pilot zone to investigate the effects of increased tube power has been terminated. Interim Report No. 2 was issued during the month as HW-31409. The region will be used to investigate the effects of increased exposure at high power levels. One 25-M failure occurred at 589 MWD/AT. The maximum exposure tube of the approximately 115 25-M tubes is now about 700 MWD/AT.

Production Test 105-567-A, "Preliminary Irradiations of J-Q Columns" - Thirteen tubes containing nineteen alternate "J" and thorium pieces were charged at H Pile on March 14, 1954. The graphite heating problem noted last month was relieved by flattening adjustments made on March 28, 1954. The test has proceeded without incident.

Production Test 105-532-A-4 - Increased slug powers were investigated at C Pile by irradiating three tubes each containing twelve uranium slugs enriched to 1.75 per cent U^{235}. Maximum slug powers calculated to be 75 KW/ft were obtained as were core temperatures up to 700 C. One piece failed at an exposure equivalent to 500 MWD/AT, based on the hottest slug, and all tubes were discharged. It is of interest to note that hollow slugs of the same material and charged at the same time have continued to operate satisfactorily at about ten per cent lower output. Their equivalent exposure is now about 600 MWD/AT.

Production Test 105-566-A, "Effect of Thermal Cycling on Slug Failure Incidence" - On April 9, three H Pile fringe tubes were charged with two enriched uranium pieces and 28 normal uranium pieces each. The enriched pieces in two of the tubes were charged adjacent to a horizontal control rod and are being thermally cycled, in two hour cycles, by moving the control rod tip in and out past the tubes. The third tube is being used as a control. The enriched pieces operate at powers of approximately 30 KW/ft of uranium, slightly less than the calculated high slug powers in the flattened region of the pile. These pieces have now been subjected to approximately 220 cycles.

Production Test 105-551-A, "High Exposure Thorium" - As the exposure of thorium pieces proceeds, heat generation per slug increases because of the formation of fissionable U^{233}. This test authorizes the exposure of thorium flattening columns to high exposures to obtain data on the rate of heat generation. One

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rupture occurred in a tube at 1220 MWD/AT, although others have been exposed above 1500. The piece has not yet been examined.

Production Test 105-562-A, "P-10 Irradiation at C Pile" - The choice of piles to be used for any future P-10 production will depend on the ability of the fuel and target slugs to operate successfully at high tube powers. This is being investigated at C Pile in the central zone. Sixty tubes have operated since the middle of February. Forty contain hot-pressed fuel slugs, the balance being cold-canned or Al-Si canned. The maximum current tube exposure is roughly 45 MWD, or slightly less than one-half of goal exposure. The tube powers of the J-N charges are about 88 per cent that of the surrounding normal uranium. In order to secure corrosion data at higher outlet temperatures, simulating increased tube outputs, water flow was reduced on fifty of the tubes. One charge was discharged as planned and replaced with graphite samples. One tube showed a 30 psi Panellit gage increase over about four days, but no furhter increase nor indications on the beta monitor. Discharge is planned at the next outage.

Pile Studies

Segmented Discharge - A study investigating the economics of segmental discharge and proposing a new method has been prepared cooperatively with Mechanical Development personnel and was issued as HW-30867. Large cost savings appear possible for P-10 and U^{233} production and some savings for 200 g/T plutonium.

Use of Enriched Uranium for P-10 or U^{233} Production - The economic and technical feasibility of using enriched uranium as a substitute for U^{235} alloy fuel pieces in tritium or U^{233} production is being analyzed.

Substitution of Thoria for Thorium in Target Slugs - The possibility of using thoria instead of thorium metal in production of U^{233} is being studied with the assistance of other technical groups, and preliminary information has been forwarded to management.

PILE PHYSICS

K Pile Startup Experiments

Technical planning on the startup experimental program for the K Piles has progressed sufficiently that detailed scheduling and planning discussions with Reactor Section personnel may be initiated. It is presently planned to carry out the bulk of the experimental program in the KW Pile in order to obtain technical information concerning K Pile operational characteristics at the earliest possible date and to save time and manpower by avoiding duplication of special instrumentation and loading patterns at the two piles where possible. The tests currently planned for the KW Pile include (1) loading to dry critical, (2) determining the dry pile temperature coefficients of reactivity, (3) loading to wet critical, (4) danger coefficients on common column loadings (5) evaluating the reactivity effect of loss of water in (6) enriched loadings and

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possibly of special slug designs in block reactivity tests, determining the small wet pile temperature coefficients of reactivity, and evaluating the control strength of the vertical safety system elements. In conjunction with these tests will be flux traverses and special irradiations for determination of fundamental lattice constants and conversion ratios. The above plans are covered in more detail in meeting minutes presented in HW-31506.

Mechanical aspects of the dry temperature coefficient test and an outline of the proposed procedure are given in HW-31454. Since this document was issued, slug-to-tube heat transfer data have been provided by the Heat Transfer Sub-Unit which indicate that helium may be necessary in the process tubes as well as in the graphite stack.

Scram Transient Studies - Production Test 105-554-A

The third and final set of scram transients scheduled under this production test for the D Pile were performed on April 10, 1954. By limiting the peak power level to about 20 MW and rising periods between 30 seconds and 40 seconds, the metal coefficient effect was made negligible; previous data have now been corrected for this effect. The indicated value for the strength for the 29 rod system in the tests performed to date is approximately 1500 inhours; temporary poison columns have been loaded in each case.

Preliminary calculations indicate that the results obtained from a "scram transient" depend rather strongly on the location of the detection device with respect to the VSR channels; further analysis of this dependence is under way. This effect will be checked in the next series of scram transient measurements at C Pile where both under-pile and experimental side chamber indications will be used. A comparison is also planned between an absolute buckling and a scram transient measurement during the K Pile startups.

Experimental Ink Facility - Production Test 105-529-A

Experimental work on the Ink Control Facility in the DR Pile was completed during the month with the recording of the gamma ray spectrum from an irradiated one per cent sample of ink. The major radiation components appear to be potassium and sodium. The Experimental Pile Physics Sub-Unit is performing this spectrum analysis.

Product Yield Predictions

A study of the various factors affecting the rate of P-10 production as a function of tube exposure is being made to determine the form of the correction curve which should be applied to the empirical H-10 data.

The results of long term irradiation studies, in which form curves for product buildup were calculated with effective thermal neutron temperature as a parameter, were used to predict product and contaminant formation in low and high

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possibly of special slug designs in block reactivity tests, determining the small wet pile temperature coefficients of reactivity, and evaluating the control strength of the vertical safety system elements. In conjunction with these tests will be flux traverses and special irradiations for determination of fundamental lattice constants and conversion ratios. The above plans are covered in more detail in meeting minutes presented in HW-31606.

Mechanical aspects of the dry temperature coefficient test and an outline of the proposed procedure are given in HW-31454. Since this document was issued, slug-to-tube heat transfer data have been provided by the Heat Transfer Sub-Unit which indicate that helium may be necessary in the process tubes as well as in the graphite stack.

Scram Transient Studies - Production Test 105-554-A

The third and final set of scram transients scheduled under this production test for the D Pile were performed on April 10, 1954. By limiting the peak power level to about 20 MW and rising periods between 30 seconds and 40 seconds, the metal coefficient effect was made negligible; previous data have now been corrected for this effect. The indicated value for the strength for the 29 rod system in the tests performed to date is approximately 1500 inhours; temporary poison columns have been loaded in each case.

Preliminary calculations indicate that the results obtained from a "scram transient" depend rather strongly on the location of the detection device with respect to the VSR channels; further analysis of this dependence is under way. This effect will be checked in the next series of scram transient measurements at C Pile where both under-pile and experimental side chamber indications will be used. A comparison is also planned between an absolute buckling and a scram transient measurement during the K Pile startups.

Experimental Ink Facility - Production Test 105-529-A

Experimental work on the Ink Control Facility in the DR Pile was completed during the month with the recording of the gamma ray spectrum from an irradiated one per cent sample of ink. The major radiation components appear to be potassium and sodium. The Experimental Pile Physics Sub-Unit is performing this spectrum analysis.

Product Yield Predictions

A study of the various factors affecting the rate of P-10 production as a function of tube exposure is being made to determine the form of the correction curve which should be applied to the empirical H-10 data. Most of the eleven pair DR columns are being irradiated to 100 MWD/column rather than the 75 MWD/column anticipated originally.

The results of long term irradiation studies, in which form curves for product buildup were calculated with effective thermal neutron temperature as a parameter, were used to predict product and contaminant formation in low and high

G/T material (HW-31295). Empirical separations data for yields at 600 MWD/ton were used to determine the "effective" neutron temperature to be employed in extrapolating to other exposures.

Long Term Reactivity Studies - Production Test 105-553-A

The six columns containing slugs whose initial reactivity status has been established in the test pile have been charged at the F Pile. These columns will be discharged at various exposures with the intent of obtaining individual slug long term reactivity transient data over the range from zero to 2000 MWD/AT. The tubes selected are all outside the flattening and rod patterns in the lower central part of the pile.

Shielding Requirements of "J" Slug Shipping Cask

Shielding information for the proposed new "J" slug shipping cask design was presented in HW-31392. Liaison is being maintained with the Design Section, and suggestions have been offered for minimizing cask weight within the given attenuation requirements.

Simulated Shield Burnout Experiment - Development Test 105-548-A

The flux in the "integrator" placed above the test slabs in this experiment to indicate fast neutron leakage has shown an increase of approximately a factor of ten with each successive "burnout" step in the second and third "burnout" steps. The paraffin used originally has been replaced with lucite because the paraffin tended to flow and because the lucite permits the location of more detectors. In the third step, the thermal flux peaked at about 1.25 inches of lucite, then fell off with a relaxation length of about 5.6 cm, relatively close to that expected for pure thermal diffusion. With a total of one-half of the masonite removed from the test slabs, the thermal flux in the outer layers has gone up a factor of approximately 1000 in the outer cycles. The gamma intensity is increasing at a greater rate than would be predicted from density changes, indicating that capture radiation from the outer regions of the biological shield has become predominant.

Although the data obtained to date cannot be expressed in absolute terms, it is indicated that the far side and top would not be accessible during pile operation by the time burnout corresponds to the third removal step several years following the water plant expansion program.

Masonite Thermal Damage

A document was issued during the month covering the study which has been made of shiled temperatures as a function of pile operating conditions (HW-31391). A check of the semi-empirical formula presented with current observations shows that the H Pile shield is running at approximately five per cent lower ΔT than predicted and that C Pile thermal shield temperatures bracket the prediction. Current temperatures at H Pile are approximately 110 C at the inside of the

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biological shield in the C test hole plugs. The measured values at C Pile with adjacent fringe tubes at 400 KW range from 160 C to 188 C, whereas 170 C was predicted.

Data on density and dimensional changes in masonite as a function of thermal exposure are being reviewed in an effort to establish a relation between structural damage rates and rates of decrease in shield moderating ability.

HEAT TRANSFER

Cooling-by-Boiling Studies

Cooling-by-boiling tests with a C Pile annulus have been completed at 100 and 250 psig rear header pressures for uniform heat generation tube powers of 250, 400, and 600 KW and inlet water temperatures of about 10, 100, and 150 C. These tests were aimed at demonstrating the feasibility of cooling slugs by vaporization of the cooling water as well as determining the maximum steam qualities which could be attained. The data may be summarized as follows:

A. Cooling-by-boiling was possible under every combination of conditions mentioned above.

B. The minimum flow rates under which cooling was stable varied from about two to fourteen gpm, depending upon the conditions.

C. Calculations based on these minimum flow rates gave steam qualities at the end of the "active zone" of about 15 to 70 per cent by weight.

In general, the highest qualities were obtained at (a) lowest powers, (b) highest rear header pressure, and (c) lowest inlet temperature. However, "power" predominates as the major controlling factor in the quality which can be reached.

Relatively minor modifications are being made to the equipment which should permit further testing at 500 psi rear header pressure. It is estimated that about two weeks will be required to make the changes. Subsequently, efforts will be made to find means for raising the pressures to 800 psi.

Major Equipment Modifications

Orders were placed during the month for a 2500 psi, 150 gpm recycle pump, a make-up pump, and a small, self-contained water treatment plant. These items will be used to modify the full scale process tube mock-up to permit cooling studies at very high pressures. Considerable difficulty was encountered in securing a pump design with the proper gland leakage characteristics; however, it is believed that the problem is essentially solved now.

The design has been completed and bids have been called for stainless steel high pressure process tubes to be used on the mock-up. These tubes are of

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sizes to accommodate heater tubes having diameters ranging from 1.44" O.D. to 2.64" O.D. In addition, the design of heater tubes is proceeding.

A work order covering the installation and acceptance testing of the new generator was issued during the month. It is anticipated that foundation work will start soon.

High Pressure Loop at H Pile

An evaluation of the operational safety aspects of the loop under proposed operating conditions is being made. Initial calculations indicate that the setup might be very restrictive powerwise.

General Tube Cooling Studies

A report is being written to present data on the amount that flow may be decreased or power increased before unstable boiling occurs in a tube. The report concerns primarily the B, D, and F Piles, and an explanation of various boiling phenomena is included.

An analysis of the effect of high operating levels on the time water may be drained from pile tubes during shutdown was made, and preliminary results were submitted to Reactor Section.

Hydraulics Laboratory Studies

The recommendation was made previously that the cone screen for K Pile consist of a simple cross-wire. Apparently the Design Council approved the use of this type of screen upstream of the venturi, but it also requested that means for installing a smaller mesh screen downstream from the venturi be investigated. A screen of this latter type was designed and is presently being tested.

Experimental studies are being made of the effect of high flow rates (25 to 40 gpm) through the rear cross-header parker fittings of the old piles. The fittings have a smaller I.D. than the pigtail, and a loss of static pressure occurs in them. This, in turn, leads to local boiling, cavitation, and water hammer. It is felt that the water hammer effects may be serious at the higher rates, and the studies of this effect are continuing.

The performances of two venturis that were designed to include the inlet cross-header fittings as part of the venturi were determined. These venturis are for use with Project CG-558. Further work is being performed to determine the effect of cross-wire screens on pressure loss.

Work is progressing on a schedule which will allow completion of the 189-D Hydraulics Laboratory about the middle of May.

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Laboratory Tests on Fuel Elements

The data from the bond conductance tests were analyzed, and a report is being prepared. The conductance values obtained were 6,000, 10,000, 25,000, and 30,000 B/hr-ft^2-F for cold pressed, Al-Si hot pressed, Al-Si lead dipped, and Ni plated hot pressed bonds, respectively. The temperature drop across a cold pressed bond of a slug at 75 KW/ft would be about 65 C.

In-Pile Slug Tests

A rupture occurred in Tube 2877-C on April 15, 1954; the "best guess" is that the slug which ruptured was an enriched uranium thermocouple slug. However, evidence indicates that the rupture was due to a split failure, and there is no reason to believe that the thermocouple apparatus was involved. As soon as possible, the charge will be removed from the process tube in which it was discharged and the exact cause of the failure determined. In the meantime, the slug temperature data are being analyzed.

Fuel Element Calculations

An analysis was made to determine whether an internally and externally cooled slug having about a 3/8" I.D. hole at the center of the slug would be feasible for in-pile testing. It was found that pile safety would not be compromised and that the slug temperatures would be reasonably close to those expected in any slug of "final design".

Studies are being made to determine the temperature effect of placing a high conductivity core at the center of a uranium slug. For example, a one-half inch beryllium cylinder might be canned in a slug; the immediate problem is to determine how much the uranium temperatures might be lowered by use of such a core.

Assistance to Other Units

The results of specimen temperature calculations were reported in HW-31481, "Calculated Temperatures in Thin, Flat, Rectagular, Aluminum-Sheathed Uranium Metallurgical Specimens for In-Pile Exposure", by S. R. Fields.

EXPERIMENTAL PHYSICS

Slug Rupture Detection

Authorization to replace the beta slug rupture detection system at C Pile with the gamma spectrometer system has been received from the Atomic Energy Commission. The directive to proceed with the replacement effort for the five older piles was received last month. Close liaison is maintained with Design and Reactor Section personnel in developing and refining the design and specifications for the gamma monitor systems. Components which differ in design from those now employed on the prototype system at H Pile are being expedited for incorporation into the prototype system at an early date for functional testing.

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Three ruptures occurred on cross-headers monitored by the gamma monitor prototype at H Pile; the basic sensitivity of the system was demonstrated superior to that of the beta system in each case. Consideration of the rupture signals as presented indicated that further improvement in performance is possible through minor modifications in system design; these are being made.

A shielded, portable gamma scintillation survey meter has been developed to increase the sensitivity with which process tubes containing ruptured slugs can be identified. On-pile tests demonstrate that this instrument has a ten to twenty fold greater sensitivity in the tube identification application than the equipment presently in use. An unshielded, light-weight version of the gamma survey meter has also been developed for the same application and will be performance tested next month.

The slug rupture detection system which was designed for the Fuel Element Irradiation facility at the Materials Testing Reactor has been constructed and performance tested in the laboratory. The equipment appears adequate and is awaiting shipment to Arco.

Measurement of Neutron Diffusion Length in KW and KE Piles

The statistical analysis of the data obtained from the measurement of the thermal neutron diffusion length in the KW Pile graphite yields an "as stacked" value 51.6 $\pm$ 0.87 cm. The differences between the calculated and measured value ($\sim$one cm) have not been reconciled as yet.

The major portion of preparatory effort for the KE Pile neutron diffusion length measurement is complete. Exceptions are personnel assignments for the around-the-clock operation and instrument assembly and servicing. It is expected that this measurement will be made late next month.

Measurement of Lattice Constants

Refinements in the measurements of the neutron density incident upon the "J" and "N" slugs in a J-N loading, with the slugs conforming to the specification for the H-10 load, lead to a predicted cold, clean initial conversion ratio of 0.67 atoms of tritium formed per atom of U^{235} depleted and k of 1.065. These values are in good agreement with reported observations on the H-10 irradiation. The uncertainty in the predicted value is believed to be about three per cent with much of this attributable to the uncertainty in the neutron cross sections. The cold, clean initial conversion ratio for the modified DR-10 load, i.e., with 8.29" "J" slugs and 3.8" "N" slugs, is calculated to be 0.63 atoms of tritium per atom of U^{235} depleted. No analysis has yet been made of the change in conversion ratio expected during the course of the irradiation.

The cold, clean initial conversion ratio for a J-Q loading, i.e., eight inch "J" slugs and six inch thorium slugs alternated, was determined to be 0.61 atoms of U^{233} per atom of U^{235} depleted; uncertainties in this determination

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depend primarily upon knowledge of neutron cross sections and of the resonance escape probability for thorium in a 105 pile lattice. The resonance escape probabilities of several types of slugs and composite slug assemblies were determined relative to natural uranium through test pile reactivity measurements; the results of this work permit conversion ratio and reactivity calculations to be made on a wide range of fuel and target slug designs in an attempt to improve the economics of isotope production. Slug types studied to date are thorium, thoria, uranium "pebbles" embedded in magnesium, and uranium-thorium wafer slugs.

Fast Neutron Distributions and Spectra

Considerable progress has been made in refining the techniques applicable to uniform development of thick nuclear emulsion plates for fast neutron distribution and spectra determinations. The program of in-pile spectra determinations will be activated as higher priority work permits; spectra determinations in a production pile will be performed as a part of the KW Pile startup program.

Instrument Development

The low level period trip systems for the K Piles have been installed in the test pile and performance testing initiated. Over-all delays in system response appear to be less than one and one-half periods for pile periods ranging between one and twenty seconds. In the case of periods shorter than one second, the delay becomes longer multiples of the period. The data obtained thus far in actually monitoring the rate of power increase in the test pile indicate that fluctuations due to statistics at low levels may be a troublesome factor. An exponential rate pulse generator has been fabricated to provide the simulated rapid pile power increase required to test the system on short periods.

A "radiation telescope" to direct a television camera viewing high level radiation zone work has been designed and fabricated. A gray wedge pulse height analyzer has been fabricated and performance tested. This type of gamma energy analyzer is economical and yields sufficiently quantitative results in gamma energy and relative intensity determinations for many applications in gamma spectroscopy.

The radial distribution of fissions in irradiated Hanford slugs have been determined in several cases by the Chemistry Research Unit, using radio-chemical techniques and, in nearly every case, marked asymmetries in the radial distributions have been noted. These asymmetries imply that the one side of a slug will possess a higher heat source density, and accumulated exposure, than will the other. Normal radio-chemical techniques are too time consuming and costly to permit these determinations of distributions on a significant number of slugs. A gamma scintillation detector, viewing radiation from a thin slice of a slug through a properly defined collimating slit, is being designed in an attempt to provide the means to correlate slug rupture or deformation with atypical distributions in either heat source or accumulated specific exposures. This is a cooperative effort with Fuel Technology and Applied Research personnel.

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Outlet Water Temperature Recording Facilities

The Flexowriter automatic tube outlet water temperature recording facilities for installation at D, DR, and F Piles have arrived on plant in major part. Detailed assistance has been given Reactor Section in checking the systems and in modifying the present pile temperature monitors to make the operation and requirements of these systems compatible with those of the Flexowriter installations.

The test of the twelve point prototype of the K Pile outlet water temperature monitor installation proceeded at H Pile. Several instances of marginal reliability in component performance have been noted and recommendations for modification made to Design Section and vendor personnel. A report discussing the performance of this prototype system is being prepared.

Reactor Safety Project

The work performed in the test pile to provide North American Aviation with data characterizing the reactivity and the neutron distributions appropriate to simulated reactor safety fuse assemblies is being analyzed and prepared for publication. The full scale mock-ups of actual fuse assemblies containing pressurized $B_{10}F_3$ have not yet been received; hence an economic evaluation of the costs to be incurred if these assemblies are used at Hanford cannot yet be evaluated.

Test Pile - Routine Tests

Regular metal testing proceeded routinely during the month. Thirty lots of uranium billet eggs were tested to yield TDS values ranging from 14 to 18. The quality of the uranium eggs tested this month is substantially poorer than has been recently experienced. Single slugs were randomly selected from each of 155 "J" slug heats and tested to yield dih values ranging from 14.7 to 16.3, with the average at 15.7. Sixty-eight heats of lithium-aluminum alloy P-10 slugs were tested with eight heats rejected for non-conformance with specification on lithium content.

Test Pile - Graphite Testing

The testing of the graphite produced by National Carbon under Contract G-12 was completed. This completes the testing of production graphite which has been contracted for to date. Reports are being prepared discussing the graphite quality and allocations for the two K Piles.

Test Pile - Special Tests

Tests performed with hollow slugs to determine the reactivity loss resulting from removing a small uranium core are being analyzed. Preliminary analysis indicates that the use of hollow slugs possessing a 0.5 inch air core center

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will cost about 120 inhours in a fully loaded 105 pile with the loss for lesser voids decreasing directly as the void volume. Additional tests may be required to firm these estimates.

MECHANICAL DEVELOPMENT

Charging and Discharging Studies

Document HW-30867, "Economic and Mechanical Analysis of Segmental Discharge", was issued during the month. Development work has been started on several of the basic mechanical devices necessary to affect segmental discharge by the flushing method.

Work continues on the revision of the present charging machines at all areas in accordance with suggestions outlined in HW-28996.

The revisions to the 108-D Laboratory flow mock-up are now complete, and the design test to determine the flushing characteristics of the K Pile poison column control system will begin shortly.

Horizontal Rod Studies

The first replacement horizontal control rod installed during March in the No. 9 rod opening at B Pile continued to operate satisfactorily. Inspection of the rod at month's end indicated no apparent leakage through the seal. The second rod, to be installed in the "A" hole at H Area, has been equipped with twelve thermocouples to measure the skin temperature of the aluminum extrusion. The rod is completely assembled and will be put in during the next outage. The third rod being prepared will be a half rod for installation at F Area. Fabrication is presently awaiting the special aluminum tubing which is expected to arrive the latter part of May.

An Interim Report, HW-30865, on the horizontal rod conversion development program was issued during the month and presents the laboratory test results of the new rods.

The first molded washer seals for use on the replacement horizontal rods were received during April. These seals were unsatisfactory for use since the silicone material did not shrink during curing as much as had been expected. The vendor has now altered the dies to counteract this and is making the second set of seals.

The horizontal rod mock-up in the 189-D Laboratory is still being modified to permit the design testing of the K rods. Several of the components are still to be received from the vendors and further work is delayed pending their arrival.

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Vertical Rod Studies

The built-up washer seal installed on VSR-16C continues to operate satisfactorily. No leakage or apparent damage has occurred to date. The seal will be inspected during the first week in May.

The design test for the K Pile Ball 3X system was completed during the month. A final report is being prepared presenting the data obtained. Strain gage measurements were made to determine the induced stresses in the rod during drop.

The design test for the K Pile VSR functional test is delayed pending receipt of the external thimble from the vendor.

Supplemental Control

Document HW-31387, "Preliminary Assessment of Disaster Control Systems", was issued during the month. This report presents the conclusions of the studies of suggested pile cooling and control systems for use under disaster conditions. The larger, more detailed report is being prepared, and it is expected that this will be issued early in May.

Preliminary development work has started on a supplemental control device based on the use of poison splines. The spline will be inserted into the process tube under the column of slugs. The only pile modification necessary involves the use of a special nozzle cap to permit sealing against the tube water pressure. Calculations indicate that one spline will be worth approximately ten inhours of reactivity. The advantages of this system are that it can be inserted or withdrawn during operation without disturbing the uranium slugs, no rear face work is necessary, and complete flexibility is possible insofar as tube location is concerned.

Process Tube Assembly and Piping

Out-of-pile pressure testing of process tube segments for the program to determine the maximum allowable inlet pressure was completed during the month. The data are now being compiled and analyzed. A document will be prepared presenting the analysis.

The final report on the Cross-Header Strainer Pressure Drop test was completed during the month and is now being reproduced for distribution.

Flexure testing of various connector designs for K Pile continued during the month. Production samples are being tested from every shipment received from vendors.

A replacement connector for C Pile was developed during the month which has now been recommended for pile application. The connector is a new design and bases its operation on a sliding joint using O-rings as seals. The connector is quite simple in its design, does not interfere with the "quickie" discharge equipment, and seems to offer advantages in every respect.

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Materials Testing Reactor Test Facility

The mock-up of this test facility was completed in the 189-D Building this month. The equipment was calibrated and tested and was found to operate satisfactorily. At month's end, the mock-up is being disassembled and crated for shipment to the Materials Testing Reactor.

Physical Constants Testing Reactor

The revised model of the horizontal control safety rod and the vertical safety disc have been assembled and are now waiting to be wired up for testing. Design of the other mechanical components such as a moving carriage and flux leveling device continue. Design of the reactor packing is approximately 50 per cent complete. All plan, view, and elevation drawings have been approved. Half of the layer drawings and 28 of the block detail drawings have also been approved. The detailed design of the building to house the reactor is being reviewed.

Other Engineering Development Work

Fabrication of the core boring device for the Graphite Sub-Units continued during the month.

Exposure of the samples for the rubber testing program continued during the month. Additional data were obtained on neoprene, natural rubber, GRS synthetic, and several silicone compositions. The silicones have been found to lose their elongation properties at high cumulative exposures but do not lose all their strength and thus would be serviceable as stationary gaskets. A large number of samples that had received a six weeks exposure were removed from 105-H during the latter part of the month. The various materials are still being examined and tested; however, several of the compounds have stood up very well while others, such as natural rubber, have deteriorated seriously.

Additional assistance was provided during the month on the preparation of design criteria and review of preliminary drawings on the application of television for rear face monitoring.

Assistance to the Pile Coolant Studies Sub-Unit continued at a constant level on the design and fabrication of underwater tube examination equipment.

PILE GRAPHITE STUDIES

Full Pile Distortion and Annealing Experiment - Production Test 105-531-E

Throughout the life of this production test, pile power level has been limited by 95 C outlet water temperature. Under these experimental conditions, maximum power level reached was 855 MW. Graphite conditions of 470 C

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maximum temperature and 35-40 per cent helium were obtained for a sufficient length of time to confirm favorable distortion and annealing trends. Vertical bowing traverses made since the inception of this test have shown a continuous annealing trend for the center portion of the top central tube (4674-D). The traverses show little or no change for the front fringe of 4674-D and for the middle portion of both the near and far side traverse channels 4494-D and 4453-D. The vertical height in the region ten to twelve feet from front Van Stone flange in the near side channel (4453-D) is steadily increasing. However, the rate of change and the profile curvature are not of sufficient magnitude to produce operational difficulties.

Since the power level is currently limited by outlet water temperature, the rising inlet water temperature has resulted in some reduction in power level. Because the minimum concentration of helium is set in the production test at 35 per cent, this reduction in power level has resulted in a reduction of the maximum graphite temperature to a value of less than 450 C. Such graphite conditions could potentially result in pile distortion similar to that which occurred during the period from July to September of 1953. It was, therefore, mutually agreed with Operations Sub-Section that the graphite temperature and helium conditions under this test would be changed to conform to present Process Specifications and that the test would be terminated as soon as the new water specifications are issued.

Future investigation of the use of helium as a means of permitting greater heat generation in the pile moderator will have to be deferred until October, 1954. By this time, there will have been sufficient relaxation in allowable outlet temperature, available water, and lower inlet water temperature to permit pile operation on graphite limits of 500 C maximum temperature and 65 per cent helium.

Full Pile Burnout Experiment - Production Test 105-530-E

The termination date of this production test was set at May 1, 1954. During the initial operation under this test, graphite burnout sample temperatures were between 490 and 500, as desired. During the last two months, the sample temperatures have varied widely and at consistently lower values as a result of changed operation and special loadings. The original objective of the test was to obtain burnout information on a full pile basis at conditions of 500 maximum graphite temperature and 30 per cent helium. As a result of the experimental J-Q load, these conditions are no longer attainable. Therefore, the production test has been terminated, and the graphite mining and burnout sample removal will be accomplished over the next two shutdowns. A final report will be issued summarizing operation under this test.

Pile Distortion

Routine vertical height traverses have been taken since the first of the year. These traverses show that the vertical height of the center portion of channel 4674 at C, DR, H, and D Piles is the same or less than the layup value. H

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Pile has shown the greatest change since startup, the center of tube 4674-H being approximately 0.2 inch below layup. At the present time, there seems to be no explanation for such a decrease in height.

The profiles of B, D, and F Piles have shown little change over the past year. Based on present operating conditions, there is little likelihood that there will be a sufficient change in tube curvature to justify, on the basis of graphite distortion alone, the use of four-inch slugs in the old piles.

Graphite Process Specifications

Based on the operation of D Pile on Production Test 105-531-E, sufficient information on the use of helium has been obtained to permit the further relaxing of this process specification. New specifications have been written and are now being processed to permit the use of a maximum of 40 per cent helium at B, D, and F Piles, and 50 per cent at DR and H, at moderator temperatures between 480 and 500 C.

GRAPHITE DEVELOPMENT

CO_2-CO as a Possible Pile Atmosphere

An experiment has been charged into the D Pile which will partially evaluate whether a relatively small percentage of carbon monoxide in the pile atmosphere can retard graphite burnout and allow relaxation of the graphite limit without other serious effects. The production test is No. 105-535-E. Approximately 40 cc/min of a gaseous mixture of 15 per cent carbon monoxide, 85 per cent carbon dioxide is being passed over a stringer of both unirradiated and irradiated graphite samples. The experiment is charged in an uncooled process tube; therefore, the samples will be near ambient pile temperature. Weight change of the samples will determine rates of reaction for both irradiated and non-irradiated material.

Graphite Irradiation Damage as a Function of Graphite Density

Information has been obtained on the physical expansion under irradiation of two series of samples which have densities between approximately 1.30 and 1.85. One series of samples was prepared by using mixtures of a carbon black with petroleum coke as a filler material. The variation in density was obtained by varying the per cent carbon black. The other series of samples was produced with only petroleum coke as a filler and the variation in density was obtained by controlling the pitch-coke ratio.

For both series, the maximum per cent expansion was obtained at a density of about 1.72, and the expansion was significantly less at both lower and higher densities.

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Pile Sampling Instrument

An instrument used to obtain core samples from the piles has been redesigned, rebuilt, and proved to operate satisfactorily in laboratory tests. A new design for the cutting teeth on the circular saw together with incorporation of positive drive for the saw primarily accounts for the improved efficiency of the apparatus.

Core samples are necessary to improved monitoring of graphite properties as conditions of temperature and flux are changed in the piles. This type of sample will be particularly valuable in monitoring of stored energy changes and use in a proposed production test to evaluate the effect of J-N loadings on fringe zone graphite.

The improved apparatus will be tested soon by undertaking to remove graphite from a pile.

WATER PLANT DEVELOPMENT

Flow Laboratory Tests

Operation of the five in-pile tubes continued. One charge of slugs from the low pH test was examined. The slugs had been exposed for 57 days to pH 7.3 water containing two ppm dichromate. Results of the examination showed corrosion rates at 80 C approximately one-half as great as would be expected in process water; also, the temperature coefficient of corrosion appears to be less at the reduced pH. No unusual localized corrosion was apparent. A second charge of slugs exposed to unfiltered water at pH 7.5 and 5.0 ppm dichromate was examined. Corrosion rates were approximately the same as those observed in regular process water, and no unusual localized attack occurred. An unfiltered water test was begun at pH 7.0 and 5.0 ppm dichromate. Radiochemical analyses of the unfiltered water continued to show high manganese activity; this activity does not appear to be a serious obstacle to the use of unfiltered water for pile cooling.

Construction of the 1706-KE Water Plant Development Laboratory proceeded. A completion target date of November 30, 1954, has been set. An investigation was made to determine the additional costs and production losses that would result from delay of either 1706-KE or 1706 KER recirculation facilities.

Plant Tests

Acid addition was begun to the process water supplying the far side of F Pile; pH is maintained at 7.3. No operating difficulties have been experienced to date. Anticipated small increases in film formation rates have not occurred. Operation of th high filter rate test continued at 183-D. The filter runs were limited by impurity breakthrough rather than by head loss as previously experienced. Efforts are under way to overcome the breakthrough effect by means of chemical feed rate adjustments and by reduced pH.

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Recirculation Studies

The in-pile recirculation loop at H operated for 30 days with an outlet temperature of approximately 120 C. An instrument failure then caused a pile scram and a switch to process water. After repair of the instrument, the tube was recharged; an outlet temperature of 145 C is now obtained. During the initial run, a water purity of 600,000 ohm-cm was attained. To improve the purification system, a larger deionizer and bypass heat exchanger were installed in the system.

A seventeen day run was made in the out-of-pile isothermal loop at 173 C and 25 gpm; water purity averaged 750,000 ohm-cm. Very little slug corrosion occurred, either on the anodized or autoclaved test pieces. The loop was recharged with autoclaved test slugs and the test resumed.

An evaluation of various ion exchange resins was initiated; this study includes a survey of the commercially available resins plus laboratory tests of their performance. Procurement of components for four high temperature loops is progressing.

Boiling Studies

Testing of corrosion effects in a steam-water mixture continued. The severe "rib grooving" observed on canned aluminum dummies did not occur with canned uranium slugs. Test conditions are: steam quality, 20 per cent; temperature, 190 C; velocity, 150 fps. A new test was initiated in which steam is condensed inside a mock-up process tube from 100 per cent quality to 20 per cent quality. Inlet temperature is 190 C, outlet is 180 C.

The recirculation boiling loop operated continuously for two weeks, at which time it was shut down for installation of a demineralizer, bypass heat exchanger, and make-up pump. Modification of the H loop to permit in-pile boiling progressed, with several check prints and sketches completed during the month. A study was made of the economics of in-pile boiling without power recovery. It is indicated that a boiling pile would be competitive with a raw water pile in first cost and operating cost.

PILE COOLANT STUDIES

The analysis of in-pile corrosion data from various production tests was completed and published as HW-31497, "Basis for the Corrosion Limit to Pile Operation". New corrosion limit specifications based on this analysis have been submitted for approval. An analysis of the data from tube examinations which describes the current conditions of pile tubes will be reported in HW-31504, "Tube Life and Its Effect on Pile Power Level". An economic analysis of the feasibility of higher power level operation with subsequent periodic retubing of the piles will be included. The economic aspects of retubing with zirconium tubes are under investigation.

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Production Tests

A slug rupture occurred in tube 2679-C, operating under Supplement A of Production Test 105-519-E. This tube had operated at an average tube power of 800 KW and an average outlet water temperature of 99 C. The slugs had reached an exposure of approximately 475 MWD/T. Because the ruptured slug stuck in the tube, it is suspected that the rupture was caused by an uranium cleavage. The ruptured slug is not yet available for examination.

Alternate slugs charged into tube 2679 had been coated with a water soluble abrasion resistant coating to prevent damage to the autoclave film during charging. Damage to the autoclave film usually results in ledge type attack on the slugs. Examination of the coated and uncoated slugs showed significantly less ledging attack on the coated slugs.

Slugs from tubes 2560-H and 1889-H showed a small amount of pitting and ledging along the rib marks. These tubes had operated at the higher outlet water temperature (95 C) authorized by Production Test 105-529-E. The attack observed on the slugs was relatively mild compared to that which had been observed on the slugs operating at outlet temperatures up to 105 C at C Pile. The pitting and ledging observed appear to be an early stage of the attack that is sometimes noted at temperatures in the vicinity of 100 C.

There are now ten tubes of weighed metal in the piles which are scheduled for greater than 800 MWD/T exposures under Production Test 105-539-E. In addition to these tubes, five more weighed metal charges have been placed in fringe zone tubes.

Based on laboratory work with low dichromate concentrations, a production test has been written and is being approved to allow 0.5 ppm dichromate to be added to the cooling water for one-half of D Pile. Another production test to study the use of zirconium tubes containing aluminum slugs under present operating conditions is also circulating for approval.

Tube Examination

Twelve pile process tubes were removed for examination from the piles during April. Only six tubes were examined during the month. The following items of interest were observed in some of the six tubes: after only eleven months' operation, tube 4362-F showed a large number of barnacles along one rib; this in spite of the fact that dichromate was used in the water. Severe ledge corrosion and slug junction pitting were observed in 0965-DR. The locations of six possibly cocked slugs were found in tube 2382-C. No obvious damage occurred to the tube.

An analysis of metal hardness data which has been collected under the tube examination program was provided to Mechanical Development personnel to determine the practicability of in-pile pressure testing of process tubes.

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Laboratory Corrosion Studies

The effect of velocity test which is being carried out in the Minitube apparatus continued during the month with velocities up to 45 ft/sec at temperatures of 95 C. An excessive number of tube failures has caused erratic operation of the high temperature Minitube apparatus using uninhibited soft water. Severe erosion-corrosion of both tubes and slug has been observed at temperatures of 135, 155, and 175 C. A pit caused by this attack resulted in a leak in the tube at 135 C after only two days' operation. Dichromate inhibitor will be added to the soft water supply in an attempt to eliminate this pitting.

The film and scale forming properties of process water at pH 7.3 are being studied in a steam heated mock-up operating between 120 and 130 C at a velocity of 15 ft/sec. A zirconium tube containing both aluminum and zirconium slugs is being exposed to the 130 C effluent water from this mock-up.

Tube corrosion data are being obtained in a weighed tube mock-up which has now operated 45 days at 90 and 105 C. A total operating period of 90 days is intended. Laboratory testing of the corrosion of aluminum in contact with wet graphite has been completed. The extent of the corrosion of the aluminum at any given temperature is a function of the time the aluminum is in contact with the water. An extremely low rate of corrosion was observed at low temperatures. It has been recommended to Manufacturing that once a leak has been eliminated, drying of the pile by either hot water recirculation or normal operation is satisfactory.

The possibility of using analyses of pile effluent water to determine corrosion rates have been investigated and will be reported in the near future. The test of pH as a function of temperature is continuing with preliminary data showing minimum corrosion rates at pH's 6.0 to 6.5. Film formation at pH 6.0 may become a problem.

The construction of the natural convection loop is now 80 per cent complete. Bids are being received on the forced convection loop, and the order should be placed during May.

TECHNICAL LIAISON

KE Loop

The proposal for modification of the CA-512-R project to include the high pressure, high temperature recirculation facility at KE Pile was finally approved by the Atomic Energy Commission Project Review Board, and authorization for design work to proceed has been forwarded to General Electric. Technical Liaison participation is planned for the design work which is scheduled to resume immediately.

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Project Representatives' Activities

The principal activity this month on CA-512-R has concerned cone screen design. A low pressure-drop, "cross-wire" type, capable of stopping particles which might plug the venturi throat, but passing particles large enough to lodge in the tube annulus, was proposed. This design was not acceptable to Manufacturing Department. The eventual decision was for a coarse mesh screen with which most of the pressure drop savings can be realized but which will provide screening protection for the annulus.

On CG-558, attention was given to the location of the backup Panellit gage installation and to the horizontal rod replacement. Initial project scoping called for the backup instruments to be located in the work areas. However, there are operational advantages to having them in the control rooms which may justify the additional cost of this location. Detailed design of the replacement rod has been completed, and procurement of the component parts initiated.

Project CG-574 concerns necessary reactor work in connection with large scale special isotope production. This will consist primarily of providing shipping casks for the spent fuel slugs expected to be used in the program. The recent re-scoping of the special isotope production effort has reduced the urgency of this work considerably.

Power Recovery Study

Preliminary consideration is being given to the possibility of recovering useful amounts of electric power from the present piles, including K. The study includes: (a) the potential gains to be made; (b) the various means available for effecting power recovery; (c) the engineering practicability of the various means; and (d) the order of magnitude costs of such pile modifications. Close contact will be maintained and assistance given to Design Section personnel who are preparing an engineering evaluation of increased pile power levels and potential power recovery from existing piles.

Plant Amortization Studies

Technical assistance is being given to Financial Department personnel studying the possible modification of plant amortization methods in regard to the useful life and obsolescence of various irradiation facility components.

SPECIAL IRRADIATIONS

Preparations for charging the next experimental assembly containing creep specimens of stainless steel (KAPL-105) in F Pile are in progress. All specimens (nickel) of the assembly now in the pile have failed.

One of the two germanium crystals bombarded by fission fragments (KAPL-118) continues to operate in F Pile. Power output, of the order of millimicrowatts, is gradually decreasing.

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A test section containing fuel pins and reactor materials for SIR and SAR was charged in the KAPL-120 loop May 1. The loop has been returned to operating conditions after an extended shutdown for repairs. Preliminary plans for the liquidation of this loop at the completion of the exposure of this test section have been completed. Negotiations with KAPL in support of building a new loop are in progress.

Discussions have been held with personnel from North American Avaiation, Inc., relative to the testing of a reactor safety element (NAA-109) at Hanford. Major points pertaining to the design for the experimental assembly have been agreed upon.

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Preparations of equipment in support of the irradiation of zirconium and zircalloy process tubes is nearing completion. The arrival of these tubes at Hanford continues to be delayed. Out-of-pile tests to determine interactions of zirconium and zircalloy with graphite and steam are being set up.

Heat generation in metals by pile radiations is being correlated with local tube power. Studies have been completed with aluminum. In the flattened zone of a Hanford pile, 0.20 milliwatts per gram of aluminum per kilowatt of adjacent tube power are generated.

Additional studies of activities of P-10 material indicate the high activities of this material can be attributed to impurities present in the aluminum prior to the alloying process.

Removal of the Snout I facility at C Pile will be covered by Project CG-558. A replacement has been designed and is being fabricated. A new facility to replace the E test hole at F Pile is also being designed.

Operations in support of isotope production and plant assistance irradiations continues as scheduled.

INVENTIONS

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

R. B. Richards

R. B. Richards, Manager
Pile Technology Sub-Section

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GENERAL ELECTRIC COMPANY

RICHLAND, WASHINGTON . . . . . HANFORD ATOMIC PRODUCTS OPERATION

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HW-31734

SEPARATIONS TECHNOLOGY SUB-SECTION

MONTHLY REPORT

APRIL, 1954

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VISITORS AND TRIPS

E. W. Rebol visited here from ANP Project, Cincinnati, Ohio, April 1 and 2, to arrange for radiochemical analyses of ANP fuel samples.

W. L. Robb and O. N. Salmon visited here from Knolls Atomic Power Laboratory, Schenectady, New York, April 6 and 7, for consultation on P-10.

K. Jackson and J. W. Ullmann visited here from Oak Ridge National Laboratory, Oak Ridge, Tennessee, April 8 and 9, on equipment performance for Redox and Metal Recovery Plants.

H. Schneider visited here from AEC, Idaho Falls, Idaho, April 14 and 15, on technical data relative to CPM program at Arco.

H. B. Coats and J. L. Schwennesen visited here from Blaw Knox and AEC, Arco, Idaho Falls, Idaho, April 15 and 16 for technical information in connection with ICPP expansion.

E. A. Luebke visited here from Knolls Atomic Power Laboratory, Schenectady, New York, April 28, for discussion of fabrication and processing of fuel elements.

G. W. Watt visited here from University of Texas, Austin, Texas, April 26 through 30, for technical consultations.

W. M. Cashin and A. N. Holden visited here from Knolls Atomic Power Laboratory, Schnectady, New York, April 7, for dicussion of fabrication and processing of fuel elements.

E. P. Galbraith visited Oak Ridge National Laboratory, Oak Ridge, Tennessee, April 5 and 6, discussing analytical procedures; he also visited the Institute for Atomic Research, Iowa State College, Ames, Iowa, April 7 and 8, discussing analytical procedures.

R. W. McKee and W. H. Reas visited Oak Ridge National Laboratory, Oak Ridge, Tennessee, April 5 through 16, for consultation on plutonium recovery operations.

R. E. Falkoski visited Los Alamos Scientific Laboratories, Los Alamos, New Mexico, April 6 through 30, in residence training relative to P-10 Program.

ORGANIZATION AND PERSONNEL

Personnel totals are as follow:

	March	April
Administrative	2	2
Chemical Development	74	71
Plant Processes	48	48
P-10 Process Studies	9	9
Analytical Laboratories	34	35
Total	168	165

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Chemical Development: One Staff Assistant - Procurement was transferred to Technical Administration, one Administrative Analyst III was transferred to Technical Administration, one Junior Engineer was terminated.

Plant Processes: One Stenographer was hired, one Administrative Engineer was transferred to Technical Administration.

Analytical Laboratories: One Junior Engineer was hired

[redacted]

Purex Plant Design Liaison

Purex Chemical Flowsheet HW #3 was issued during the month, as Document HW-31373. This flowsheet supersedes Purex Chemical Flowsheet HW #2 and reflects modifications in plant and process design made during the past year as a result of the application of new engineering ideas and the development of new data from experimental studies. The most important changes include: (a) utilization of two-step fractionation for recovery of nitric acid, with the second step operated under vacuum to reduce equipment corrosion, (b) steam stripping of the inter-cycle uranium product streams prior to concentration (this flowsheet feature was incorporated when concentrator redesign altered inter-cycle hydraulics), and (c) dual (water) scrub operation on HA and 2D Columns to achieve product purity (in the case of 2D) and decreased corrosion in the respective uranium concentrators.

Chemical Engineering Development

Three Inch Pulse Column Studies with Nozzle Plates - The investigation of nozzle plates was continued, with twenty two Purex "C"-type column and eighteen "O"-type column runs carried out during the month with "cold" uranium in a three inch diameter glass pulse column. The studies were made under the approximate conditions of Purex Chemical Flowsheet HW #2. The highlights of the new findings are as follows:

1. The stainless steel nozzle plates employed in the "C"-type and "O"-type runs were of the following geometry: 9 per cent free area, 0.12 inch diameter holes with 0.04 inch nozzles (indentations) pointing down, 4 inch plate spacing. The 3 inch diameter column results indicated that - -

as high as 1700 gal./(hr.)(sq.ft.), sum of flows, (equivalent to 34 tons U/day in a 34 inch diameter, i.e. Purex Plant size, HC Column) with the nozzle plates, while only 1100 gal./(hr.)(sq.ft.) could be attained with the fluorothene plates. (This comparison is based on bottom interface operation in both cases.)

3. IO Column performance (with a bottom interface position) with the 9 per cent free area nozzle plates compared favorably with the performance obtained with fluorothene plates 3/16 inch holes, 23 per cent free area, 4 inch spacing), optimum nozzle plate uranium transfer H.T.U.'s being about 40 per cent lower, capacity 80 per cent higher, and pulse requirements about the same. With the nozzle plates stable operation was obtained at a superficial throughput rate equivalent to as much as 36 tons U/day, based on a 34 inch diameter (Purex Plant size) IO Column (i.e. 1800 gal./(hr.)(sq.ft.), sum of flows).

4. Reduction of the nozzle plate free area for the IO Column from 23 per cent to 9 per cent eliminated low pulse frequency instability. As reported in February, the IO Column with 23 per cent free area nozzle plates was inoperable below a certain critical amplitude frequency product (38 in./min. at 500 gal./(hr.)(sq.ft.), sum of flows), due to the entire plate section becoming filled with a shad-roe-like emulsion and finally flooding. With 9 per cent free area nozzle plates no such difficulties were encountered at amplitude frequency products ranging as low as 18 in./min. at 500 and 1000 gal./(hr.)(sq.ft.).

Technical Manual

On April 25 the preparation of the Purex Technical Manual was approximately 23 per cent complete.

Mechanical Development

Pump Development - A Peerless 4LA (P-5) deepwell turbine pump with a 5 foot drive shaft has operated on life test for 2450 hours pumping HAX (Shell Spray Base plus 30 per cent TBP) at 39 gal./min. against a head of 6 feet. The five process solution lubricated bearings were machined from the CSGBF pile graphite set aside for Purex pump bearings.

Instrument Development - Interface Control - Work has started on the development of a capacitance probe adapted to remote maintenance for control of the Purex Plant 2A Column interface. A side chamber to house the capacitance probe located outside the 2A Column dunnage where the canyon crane can reach the probe is connected by 1 inch pipe to the column above the interface position and to the lower end of the "beaver tail" bottom disengaging section. Initial tests have been promising, exhibiting good control of the interface in the column.

Materials Testing

Nitric Acid Fractionator Corrosion Studies - Three runs of 90 hour duration were made in a pilot plant nitric acid fractionator to determine the corrosion

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rate of the single, Type 347 stainless steel reboiler tube under varying conditions. Details of these runs are tabulated below. The new data confirm the decision to convert the Purex Plant nitric fractionating column to vacuum operation in order to minimize corrosion of the reboiler heating surface. Corrosion of the pilot plant reboiler tube operating at atmospheric pressure under conditions of the Purex Plant No. 1 acid concentrator was fairly high (0.006 in./mo.), and studies will be directed toward reducing the rate of attack in this service.

CORROSION RATE OF TYPE 347 STAINLESS STEEL REBOILER TUBE

Boiling Solution	Top Column Pressure, Mm. of Hg. Abs.	Liquid Temp., °F.	Steam Temp., °F.	Corrosion Rate, In./Mo.
*60% HNO_3 (13 M)	100	160	260	0.001
60% HNO_3	400	212	312	0.003
*60% HNO_3	760	-	-	0.015
IWW (8.5 M HNO_3)	760	238	335	0.006
30% HNO_3 (5.6 M)	760	230	327	0.0015

*Note: Reported last month, but included here for comparison.

Heat Transfer Surface Corrosion Studies - Pilot plant scale corrosion tests of stainless steel heat transfer elements in Tank F-4, 321 Building, have been completed for the first set of elements. The elements were removed from the tank after immersion in simulated Redox D-12 solution for 41 days with an average steam pressure of 32 lb./sq.in. and 53 days with an average steam pressure of 80 lb./sq.in.

Of the four types of stainless steel tested, 304L exhibited the best corrosion resistance. Carpenter 20 was attacked most severely while Types 309 SCb and 347 were corroded to an intermediate extent. This order of corrosion severity was observed on both bayonet type and process tube type heat transfer elements.

Irradiation of Kel-F - The irradiation of 32 Kel-F test coupons (4 sets of 8 coupons) in fresh Redox Plant dissolver solution has been completed. Total radiation dosages on the four sets of coupons approximate 10^6, 10^7, 5 x 10^7, and 10^8 roentgens (beta plus gamma). Physical testing and examination of the irradiated coupons to determine tensile strength, hardness, and flexural fatigue are planned.

Ten Unirradiated Kel-F flexural fatigue coupons fabricated from perforated plate, and currently under test, have endured 9.2 x 10^7 cycles at a calculated maximum stress of 600 lb./sq.in. Six of the coupons had been notched to centralize the stress. In four of these the specimen has started to crack at the notch, but to date none of the coupons has broken completely through. This

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stress is about 10 to 20 times greater than would be experienced in the Purex Plant columns. 9.2×10^7 cycles corresponds to about 625 days of operation in the Purex Plant.

REDOX DEVELOPMENT

Process Studies

Copper Sulfide Scavenging - The possibility of replacing the present permanganate head-end treatment for the removal of ruthenium from Redox feed solution with the CuS scavenging treatment has been reconsidered. If this treatment were feasible for use in the Redox Plant, such a process change would greatly reduce the amount of ruthenium discharged to the atmosphere from the Redox stack. As presently visualized the CuS scavenging treatment does not appear attractive for inclusion in the plant as a head-end treatment for the following reasons:

1. Radiation instability. The Chemistry Unit found that in the presence of the high radiation fields present in first cycle Redox feed solutions the copper sulfide precipitate becomes a sticky gum which would be difficult to remove from head-end vessels.

2. Possibility of formation of free sulfur. Even if it were possible with additional research effort to produce a radiation stable CuS precipitate, the possibility of producing free sulfur exists. Processing conditions must be very carefully controlled to prevent oxidation of CuS and H_2S to form free sulfur. If free sulfur were formed in a head-end treatment, it could conceivably cause far reaching effects in the rest of the plant. Studies would be required to determine whether cruds and emulsions would be encountered in the solvent extraction columns.

3. Effect on plant capacity. Calculations indicate that employment of a copper sulfide head-end treatment would reduce the head-end capacity of the Redox Plant from the presently estimated 10.7 tons U/day to approximately 7.7 to 8.8 tons/day.

4. Hydrogen sulfide evolution. Calculations indicate that H_2S would be discharged from the Redox ventilation stack at a maximum concentration of approximately 900 p.p.m. Although the normal stack dilution to the ground level would be expected to reduce the H_2S concentration in the air around the Redox Plant below 20 p.p.m., which is considered the maximum safe concentration for an 8 hour working time limit, the presence of H_2S in the stack gas would undoubtedly under some weather conditions occasionally become a nuisance, if not a real hazard.

Bismuth Phosphate First Cycle Waste Scavenging. At the present time T Plant first cycle wastes are being discharged to trenches in the ground. Since the possibility of contaminating ground water with the fission products in this waste exists, trench discharge must be discontinued. A chemical flowsheet is currently being prepared based upon Chemistry Unit laboratory data for the scavenging of long lived fission products from the first cycle wastes and discharge of the scavenged supernate to cribs.

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Process Chemistry

Head-End - Iodine Behavior in the Presence of Mercury - The use of iodine tracer in synthetic dissolver solution indicates that very little iodine is retained on the MnO_2 cake, either in the presence or absence of mercury.

Emission of Radio-ruthenium from Redox Stack - Laboratory studies indicate that the mechanism by which RuO_2 is formed from RuO_4 in the Redox oxidizer-scrubber system does not include radiation decomposition as a primary factor.

Waste Tank "Bumping" - Laboratory data indicate two possible conditions which may contribute to "bumping" in the Redox waste storage tanks: one as a result of too large an excess of NaOH (i.e., 20 to 25 per cent stoichiometric excess which, contrary to previous belief, results in essentially no precipitation of aluminum at temperatures approaching boiling), and the other typified by only 3 per cent excess NaOH which results in approximately 10 volume per cent $Al_2O_3 \cdot 3H_2O$ precipitate at boiling temperature. The most satisfactory conditions (i.e., those giving the lowest "bumping" frequency in the laboratory) appear to be those which most closely correspond to recent plant practice - estimated currently at 5 to 7 per cent stoichiometric excess of NaOH since the coating removal wastes are now being kept separate from the balance of the neutralized waste. From these studies it appears possible that the bumping in Tank 101-S (at its worst about December, 1953 and January, 1954) may have been due to the well known superheating phenomenon which occurs in boiling caustic solutions rather than exclusively to the deposit of solids as first postulated. It is concluded that "bumping" in the Redox waste storage tanks whose contents are at the boiling point can be minimized by close control of the NaOH content which will assure a final concentration of caustic of approximately 7 per cent in excess of the stoichiometric requirements.

Self Concentration of Redox Stored Wastes - A concentration of synthetic neutralized Redox aqueous wastes in the laboratory disclosed that the maximum concentration that may be achieved by self concentration in underground storage tanks results in a volume reduction of 3.3. This concentration to a boiling point of 144 C (at which temperature the mass solidified) was performed in the laboratory on a waste of current Redox Plant composition, including coating removal and head-end wastes, having a neutralized specific gravity at 25 C of 1.323, and represented an excess of 0.4 pound of 50 per cent NaOH solution per gallon of waste above stoichiometric neutrality, as determined analytically.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Two Cycle Mixer Settler Runs - A series of two cycle "Mini" mixer settler runs initiated last month has been continued to include feed solutions to the Mini consisting of various blends of current Bismuth Phosphate T-Plant waste (7-3 WS) with C, B, and T Tank farm feed approximately 3.5 years old. Satisfactory fission product decontamination (uranium product gamma activity of 300 per cent of that of aged natural uranium) appears to have barely been achieved in two cycles using a 50-50 blend (U basis) of current T-Plant waste

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(600 MWD/T) and aged metal waste as feed, while a greater margin of safety was obtained with a feed containing only 25 per cent current waste. The second cycle decontamination values reported for the previous month (HW-31267) appear to be in error in predicting adequate decontamination of 600 MWD/T material in two cycles. Evidence continues to indicate that 200 MWD/T material can be adequately decontaminated in two cycles.

Oxalic Acid as Pu Partitioning Agent - The use of oxalic acid in the RAIS as the plutonium partitioning agent has been investigated in a series of miniature mixer settler runs. The data indicate that with an RAIS containing 4 M HNO_3 and 0.1 M $H_2C_2O_4$, meeting the specification of 10 parts Pu/10^9 parts U will be borderline. Furthermore, when the RAIS acidity is increased to 10 M HNO_3 (still employing oxalic acid vice ferrous ion), the plutonium content of the uranium product will exceed specifications by a factor of 2 to 3.

Urea Pretreatment of RAF - The effect of digesting acidified and concentrated 3.5 year old RAF with urea has again been investigated. The pretreatment consisted of a 2 hour, 95 C digestion of RAF made 0.05 molar in urea. The feed solution was "cooled" and processed through a miniature mixer settler under TBP-HW #4 Flowsheet conditions. The results indicate that ruthenium decontamination was decreased 2 to 3 fold under these conditions.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

High Efficiency Pulse Column Development - Very low H T.U. values, approaching 1 inch, have been obtained previously (by the Chemistry Unit, Applied Research Sub-Section) in 1 inch diameter pulse columns. It has now been demonstrated that similarly low H.T.U.'s are obtainable on a 3 inch diameter scale by a combination of favorable design factor (notably small perforations, low fraction of free area, close plate spacing). H.T.U. values as low as 1.2 and 1.4 inch, respectively, at 200 and 1000 gal./(hr.)(sq.ft.), sum of flows, were determined in a 3 inch diameter pulse column with a 13 inch high sieve plate section consisting of 0.5 inch space stainless steel plates with 0.026 inch holes, 15 per cent free area. Uranium was used as the diffusing component, under the approximate conditions of the Purex HW #2 Chemical Flowsheet HA Column, with the solvent (HAX) preacidified to 0.4 M HNO_3 (to aid initial phase dispersion). A 0.25 inch pulse amplitude was used, at 220 cycle/minute. The column temperature was approximately 40 C.

HOT SEMIWORKS DEVELOPMENT

Mechanical Development

Wear Characteristics of Regenerative Turbine Pumps - The Roth D-93, vertical, submerged, regenerative turbine pump (nominal capacity 20 g.p.m.) was inspected after 188 hours of operation pumping simulated Redox IAF solution at 350 ml./min. against a 70 foot discharge head. This pump, which is similar to those which have given generally satisfactory service in the Redox Plant for periods up to 1 to 2 years, and identical with those which failed after 200 to 500 hours service in the Hot Semiworks during "hot" Redox process studies, is being

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tested to destruction under the conditions of near shutoff operation employed in the Hot Semiworks. Evidences of high bearing and journal wear support the conclusion that failures of these pumps in the Hot Semiworks were a direct result of operating large regenerative turbine type pumps at near shutoff conditions.

Conversion to Purex

The design phase of the Hot Semiworks conversion (original scope) is now complete and the design of the experimental waste self concentrator is 18 per cent complete. The construction phase of the conversion effort is now about 35 per cent complete. Work is proceeding in "A" Cell under time limits approaching 2 to 2 1/2 hours with working time limits in all other sections of the semiworks proceeding under 8 hour working time limits.

URANIUM RECOVERY PROCESS TECHNOLOGY

Metal Removal

Approximately 4570 net gallons of stored waste were removed by water sluicing and direct transfer of supernatant for each ton of new uranium processed. Water sluicing increased the above volume by about 4370 gallons per ton of uranium. Ninety five per cent of the above uranium was from tanks containing some metal aged a minimum (not average or effective) of 3.25 years, while the balance was aged at least five years. More efficient utilization of existing facilities for uranium removal operations included the initiation of TX supernatant blending at the UR facility per schedule, and the initially successful application of continuous water sluicing while incrementally balancing blend batch removals and water additions at BXR. The BXR operating method initially gave dilute feeds at up to 0.35 pounds of uranium per gallon compared with long term average values of about 0.2 pounds of uranium per gallon and, if sustained operation at these new high feed concentrations is experienced, capacity bottlenecks due to cross country pumping rate limitations may be minimized. A new high seven day period removal rate (149 per cent of extraction plant design) was attained during the last week of this report period using a combination of water sluicing at BX and TX (BX continuous) with supplementary BX-BY, and TX supernatant blending at CR and UR, respectively, to give four "effective" tank farm facilities. The previous high (145 per cent) was realized during the seven day period ending June 5, 1953, using four tank farms with combined water sluicing and supernatant blending. Almost no down time (2 hour electrical outage) was experienced.

Feed Preparation

Acidification of the above feeds at the tank farms, in 241-WR Vault, and in 221-U Building used about 13230 pounds of 100 per cent nitric acid per ton of new uranium. The nitric acid to uranium ratio was adjusted downward from an average 3.5 pounds titratable nitric acid per pound of uranium to 3.0 pounds titratable nitric acid per pound uranium on April 19. The acidification steps were followed by an average 66 volume per cent boiloff in 221-U evaporators to give feed of the following average composition:

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	Components M (a)					$K^{1/2}$ NO_3 Range
	U	SO_4 (b)	PO_4	HNO_3 (c)	Na	
Feed	0.271	0.3	0.308	3.66	4.38	4.1 to 6.1
TBP HW #4	0.270	0.260	0.260	2.70	4.06	5.5

(a) Balance of anion is NO_3^-

(b) Estimated as about equal to $PO_4^{\equiv}$

(c) Tritrable, including two H $\div$ ions each from $SO_4^{\equiv}$, and $PO_4^{\equiv}$

Calculation of the above feed composition to a "flowsheet" basis, including 1.66 M "free" HNO_3 at 0.27 M U, indicates that about 1510 pounds of extra nitric acid were employed for each ton of uranium processed.

Non-routine feed handling included concentration and acid butting of about one per cent of the feed uranium in high gamma RCU's.

Concentrated feeds were supplied uncentrifuged to the solvent extraction batteries.

Waste Handling

Approximately 4110 gallons of neutralized concentrated waste were returned to underground storage for each ton of new uranium processed. This salt waste included about 0.89 per cent of the new feed uranium and also about 3370 pounds of sodium nitrate per ton of uranium through neutralization of extra nitric acid in feed and in RA scrub. The extra nitric acid, neutralized, contributed about 575 gallons to the above 4110 gallons per ton waste volume. The capacity of a single waste concentrator (9-1) operating to give a waste specific gravity of 1.37 to 1.40 was limiting at about 10 tons per day. Waste pH was routinely controlled at 8 to 10 with an average of 8.8. About 18600 gallons of low activity waste, containing an additional 0.044 per cent of new feed uranium, were cribbed for each ton of new uranium processed.

Solvent Extraction

Operating Conditions

The total uranium processed by the solvent extraction batteries was 123 per cent of the nominal design input rate including 98.7 per cent virgin uranium, 0.95 per cent RCU rework, and 0.35 per cent 224-U rework uranium. Overall on-stream time efficiencies for "A" and "B" Lines were 85 and 97 per cent, respectively, giving an overall operating time efficiency of 91 per cent. Both lines were shut down (19 hours) for Condenser Vent Blower failure. Additional "A" Line down time included flushing operations (13 hours), P-19-6 (RAF) failure (55 hours), and (either line could have been shut down) waste space limitation (16 hour). Single line instantaneous processing rates ranged from 75 to 213 per cent of nominal design rate.

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Operations were generally carried out at TBP HW #4 flowsheet conditions using 20 volume per cent TBP in hydrocarbon diluent as organic phase and dual scrub RA Columns. Average nominal flow ratios expressed as per cent of TBP HW #4 flowsheet were:

Line	RAS	RAIS	RAF	RAX	RCX
A	100	100	100	90	50
B	100	100	100	110	60

Departures from flowsheet compositions and conditions included:

1. Heating RCX to 55 ± 5 C (RAX at about 40 C)
2. 6 M HNO_3 in RAIS vice 4 M HNO_3
3. "Free" HNO_3 in feed at 2.44 M vice 1.66 M
4. Additional in-tank continuous solvent washing at L/V = 0.15.

Feed activity was 11.9 curies per ten kilograms of uranium indicating an estimated effective age of 4.8 ± 0.5 years since pile discharge after an average 328 MWD/T irradiation in the piles.

General Performance

RAW losses averaged 0.2 and 0.45 per cent of the feed uranium for "A" and "B" lines, respectively. The corresponding losses for the preceding monthly period were 0.3 and 1.1 per cent. The greater improvement demonstrated by "B" line is attributed to use of 110 per cent extractant flow (RAX) in this line versus 90 per cent in "A" line. The absolute differences between these two lines vary because of several differences in operating functions and mechanical difficulties.

RCW losses averaged 0.1 and 0.4 per cent for "A" and "B" lines, respectively, including operation using ambient temperature RCX on both lines during heat exchanger maintenance and an excessively high loss (17 per cent) on "B" line during test operation at L/V = 0.46 (40 per cent RCX, 110 per cent RAX). Comparable loss values for periods using RCX at 55 ± 5 C were 0.03 and 0.04 per cent at L/V = 0.7 in "A" and "B" lines, respectively. An L/V of over 0.6 appears to be essential for maintenance of less than 0.1 per cent losses to RCW using RCX at 55 ± 5 C. The "B" line RCW losses did not increase at rates up to 8.5 T/D.

Gamma dF's ranged from 4.2 to 4.6 giving product RCU from 320 to 140 per cent of aged natural uranium gamma. The RAIS nitric acid concentration was 6 M and extra acid was added to the feed to give a feed point nitric acid concentration (including acid reflux) of 0.7 to 1 M higher than that attained during the previous report period. Comparison of the two report periods indicates a possible improvement of about 0.05 dF units (arithmetic factor of 1.12). This small improvement is not necessarily brought about by the increased acid,

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since the difference may be partially accounted for by, a) 328 average MWD/T for this period versus 348 average MWD/T for the previous period (less Ru to uranium in feed) - factor of 1.06; b) 30 days additional "aging" - factor of 1.06; and c) slightly improved solvent quality. During the last quarter of the report period acid in the feed was progressively reduced to values closer to flowsheet without any perceptible change in dF not attributable to feed source. The "A" line dF's were lower than "B" line dF's. Operating conditions for the two lines were comparable except "B" line had twice weekly interface jettings for about half of the report period while "A" line did not. The "A" line interface jet has been restored to service.

Plutonium, metallic impurities, and HNO_3 in RCU product averaged three parts per billion parts uranium, 90 parts per million parts uranium, and 0.03 pounds of nitric acid per gallon (equivalent to 0.03 M at flowsheet uranium concentrations). No change in plutonium dF was evident when RAIS nitric acid concentration was increased from 4 to 6 M.

Solvent Treatment

Solvent consumption for the report period was 7.3 and 1.6 gallons of diluent and TBP respectively for each ton of new uranium indicating excellent phase decanting and low entrainment losses. Continued operation of the RO Columns and ROO continuous wash tanks using three weight per cent sodium carbonate gave RAX at 1×10^{-5} pounds uranium per gallon and 17 gamma microcuries per gallon.

Equipment

No major equipment changes were made. Down time due to equipment failure included 19 hours for Condenser Vent Blower failure (both lines), 55 hours for "A" line RAF pump (P-19-6) replacement, and 16 hours (one line) due to P-001 WR (waste transfer) failure.

URANIUM CONVERSION PROCESS TECHNOLOGY

Uranium Concentration and UO_3 conversion operations were carried out at 102 per cent of nominal design rates to produce UO_3 including about 72 per cent TBP source and 28 per cent Redox source uranium. Metallic impurities, gamma, and plutonium in UO_3 product averaged 106 parts per million parts uranium, 51 per cent of aged natural uranium, and less than five parts per billion parts of uranium, respectively. A test carload of high reactivity (1.3) powder was produced using about 0.08 weight per cent sulfamic acid as additive to the pot charges; however, process problems, including rate limitation at ca. 9.5 tons per day, pot caking, and hammer mill screen damage, were encountered. Preliminary observations by the customer (Carbide and Carbon Chemical Company - Paducah) indicate that reactivity increases were applicable under plant process conditions. Initial testing of one Luckey pot, resulting in production of about 1.8 per cent of the total UO_3, was carried out and it is indicated that successful operation of this equipment may be expected, although a current problem appears to be high powder entrainment to the ventilation system. Investigation of operating variables leading to optimum powder quality has been initiated. Acid recovery operations were routine, resulting in

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recovery of about 1010 pounds of 100 per cent nitric acid in ca. 35 weight per cent acid, per ton of uranium processed. The first X-3 (unloading system) orlon bag failure occurred after 58 days in service. Uranium losses included 0.04 per cent in condensate, compared with 0.39 per cent for the previous report period, reflecting improved cyclone efficiency at higher feed to steam ratios. Nitric acid routinely sent to the tank farms contained about 5.6 pounds of uranium (1.1 per cent) for each electric pot calcination uncorrected for Luckey pot operation and E-D-1 evaporator losses.

Miscellaneous items of significance to the operability and efficiency of the process included: a two fold reduction of high radiation levels by the use of appropriate stainless steel shielding which prevents the operator from "seeing" large areas of the interior pot surfaces during unloading; a plate inspection of the upper section of T-D-4 (fractionator) which indicated expected continued satisfactory performance for the production of about 35 weight per cent nitric acid; initiation of UO_3 powder recovery from filter media by vacuum cleaner; a laboratory test of orlon filter bag material showing that dust collection efficiency is about the same as for wool bags; calculation of Luckey pot sag at only 5/16 inches with 9/16 inch additional indicator deflection due to expansion of measuring device (to be checked by cathetometer measurements); initiation, on a trial basis, of C-2 uranium (224-U waste) blending in process streams; and planned installation of an "expendable" T-D-4 (fractionator) reboiler coil comprised of short sections of various stainless steel types of pipe and welding rod for obtaining corrosion data.

REDOX PROCESS TECHNOLOGY

Summary

The Redox Plant was shutdown from March 29 to April 7 for decontamination and repair of the canyon crane. During the downtime, the extraction columns and H-5 Ruthenium Scrubber were flushed, and several minor maintenance items were performed in the canyon. Process performance during the month was normal with the use of a permanganate oxidation of IAF, three Uranium Cycles, and three Plutonium Cycles. Recovery of plutonium from 231 and 234-5 Building supernatant solutions was instituted on April 15 and has been performed without process difficulties. Testing of the dual scrub 2D Column flowsheet was reinstituted toward month end, but a complete evaluation has not been made.

Process Performance

Decontamination performance and waste losses have been normal throughout the month. As indicated in last month's report, increased IA Column instability was apparent after operation for ten days without centrifugation of IAF. Also, there were indications of increased entrainment of activity (primarily zirconium-niobium) into the third cycles. Therefore, water and concentrated nitric acid flushes of the extraction columns (except 2D) were performed on April 3 to 5. Approximately 180 gallons of 3BP solution required rework through the Plutonium Cycles because of excessive zirconium-niobium contamination entrained from the 3A Column interface at start-ups. One salt waste batch was reworked (discussed under Feed Preparation) without difficulty. No uranium rework was required.

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Feed Preparation

The dissolvers were charged with uranium having an average pile exposure of 619 (554 to 629) MWD/T. The semi-continuous acid addition technique for dissolving remained essentially unchanged. Beginning on April 23, a new schedule (outlined by Separations Process Unit) of coating removal and dissolving times was instituted in order to reduce the emission of ammonium nitrate from the stack. According to this schedule, dissolving is not performed in any dissolver during the coating removal operation (except the final two hour digestion period) in another dissolver. On the ideal time cycle being attempted, a dissolving rate of seven tons of uranium per day may be attained.

All IAF batches were oxidized by a permanganate Head-End treatment procedure using chromic nitrate as the reductant. Several modifications to the Head-End step have been made during the month in order to: a) process 231 and 234-5 Building supernatant solutions for recovery of plutonium; b) rework Redox salt waste for recovery of plutonium and uranium; and c) reduce the emission of radio-ruthenium from the ventilation stack.

The processing of 231 and 234-5 Building recycle solutions has been essentially adopted as standard procedure. The procedure for processing recycle (HW-30501) involves addition of the solution to E-22 Recycle Addition Tank, sampling, and transfer to H-4 Oxidizer as the initial solution for make up of the IAF batch. Critical mass control procedures limit the amount of plutonium contained in E-22 Tank and transferred to H-4 Oxidizer. Adjustments in Plutonium Cycle flow ratios are made on the basis of the plutonium concentration of IAF in order to maintain approved concentrations in other plutonium solutions.

Rework of Redox salt waste (Batch PW-23) for recovery of 27 units of plutonium and 103 pounds of uranium was accomplished without a reduction in the rate of processing of fresh dissolver solution and with a slight cost saving. The procedure used involved blending approximately 200 gallons of waste with 1700 gallons of dissolver solution and processing essentially as a normal Head-End batch. Thus, because the instantaneous capacity of the Head-End step is currently higher (approximately 30 per cent) than that of the columns, the Head-End equipment could provide IAF at the maximum processing rate of the columns. The flowsheet used for processing this blended IAF through the IA Column involved only a revision of flow ratios. The normal and revised ratios are as follows:

Normal	Revised
IAF:IAS:IAX = 100:115:400	IAFS:IAS:IAX = 110:105:400

Since the IAS flow was reduced, this revised flowsheet actually saved approximately $40 per ton of uranium processed during the rework period. No deleterious effects on decontamination or recovery were noted.

Two new instruments, an H-5 Ruthenium Scrubber pump flow recorder and a monitored strip filter for stack gas sampling have been employed while making several tests to reduce the emission of radio-ruthenium from the ventilation stack. The strip filter allows collection of particles from an air sample drawn

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from the twenty foot level of the stack for a preset time (e.g., 10 minute cycle or greater), and then the particulate activity is counted and recorded. From these recordings the times of the major emissions of radio-ruthenium (as particulate RuO_2) from the stack have been observed to be those when the permanganate is added to the H-4 Oxidizer, primarily the sacrificial permanganate addition. Thus, the following variations in addition procedure have been studied:

(a) rate of permanganate addition was decreased five-fold, and no significant improvement was noted;

(b) operation of H-5 Ruthenium Scrubber at different temperatures and caustic recirculation rates has shown no significant effect; and

(c) establishment of maximum water reflux in H-4 Oxidizer tower before permanganate addition is probably of considerable benefit.

Stack Activity

Activity released to the atmosphere and environs through the ventilation stack is summarized below:

	Average, curies/day	Maximum, curies/day
I^{131}	1.8	14.4
Ru	0.8	3.9

The high iodine emission was the result of breakthrough of A-3 Silver Reactor on April 12. Since A-3 Reactor had just been regenerated on March 17, its rapid failure is attributed to operation without power to the heaters on April 7. The high ruthenium emission was coincident with the H-5 Ruthenium Scrubber flush (1.5 per cent $KMnO_4$-0.5 per cent NaOH followed by 15 per cent HNO_3-3 per cent H_2O_2) performed on March 25 and 26. The flush was performed to remove ruthenium dioxide from the packing and pot.

Uranium Extraction and Decontamination

Nominal solution compositions of the ORNL June 1949 (acid deficient) Flowsheet were employed for the Uranium Cycles. The concentrated 2.45 M UNH flowsheets were used for the Second and Third Uranium Cycles. The 2D Column was operated on a dual scrub flowsheet for testing of this flowsheet in preparation for 3DW backcycle operation. Initial operation employed the same flowsheet as the 3D Column, but decontamination performance appeared to be a factor of three lower than for the single scrub 2D Column flowsheet. Therefore, the flow ratios were revised to improve decontamination. Although considerable improvement was noted, continued sub-normal decontamination was achieved, so the 2DA was acidified (0.06 M HNO_3) in order to improve phase disengagement and reduce entrainment. The appearance of samples of 2DU taken before and after the acidification of 2DA indicates that phase disengagement was significantly improved by the acidification.

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Waste Processing

No additional indications of pressure surges in the 241-S Farm tanks have been observed during the month. On April 22, the neutralized salt waste was diverted from 110-U cascade in 241-U Farm to 104-S cascade in 241-S Farm. Coating wastes are still being routed to 101-S cascade, and centrifuge bowl cleanout wastes to go 107-S.

T-PLANT (BISMUTH PHOSPHATE) PROCESS TECHNOLOGY

A replacement for the 3-5R-T off-gas filter, which was necessitated by the failure of the by-pass system rather than any malperformance of the original filter, was packed with following glass fiber bed formulation:

Layer No.	Type Fiber*	Bed Depth (inches)	Packing Density (lbs/ft.^{3})
Clean-up	PF-105	1	1.2
Third	115 K	20	6.0
Second	115 K	10	3.0
Bottom	115 K	12	1.5

* Nomenclature is that of the Owens-Corning Fiberglas Corporation

IN-LINE INSTRUMENTATION

The Redox automatic stack gas monitor was placed in service early in the report period. The instrument gives a continuous, quantitative record of stack gas activity, and the activity variations can be related directly to process operations.

The performance of TBP Plant in-line analytical instruments was generally satisfactory for operating units during the entire month. Efforts were concentrated on the development and installation of improved RAW polarograph sensing units, the installation of operating panel cycle-controllers for uranium photometers and polarographs, the installation, calibration, and testing of a newly developed uranium photometer sensing unit molded of Scotchcast, and the installation and testing of a glass-and-Scotchcast pH sensing unit at the effluent end of the Pooled Waste Neutralizer. The plastic sensing units have been developed by Chemistry Unit personnel to reduce fabrication costs and to provide ease of installation, ruggedness, and compactness.

Inadequate continuous sampling facilities and faulty plumbing (valve and jumper leaks and jet plugging) continued to be the major causes of periodic failure or maloperation of in-line analytical instruments.

Z-PLANT (ISOLATION, PURIFICATION AND FABRICATION) PROCESS TECHNOLOGY

Isolation Building (Task I)

Material balances across the isolation step based on the CA/RA (grams of plutonium per ml/counts per minute per ml) factor have been 99-100 per cent

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as compared to 96-98 per cent for balances based on the MWD/T factor.

Plutonium(IV) oxalate cakes are now washed with 2.5 Kg of distilled water. This procedure was adopted when data from test runs indicated it to be satisfactory. However, follow-up evaluation has shown that product purity may be adversely affected by this wash procedure since total impurities in the finished pieces, exclusive of 70-58, have about doubled during the past six weeks.

Dry Chemistry (Task II)

Based upon fluoride color, 11.5 per cent of all runs through Task II required hydrofluorination. This compares to 17 and 16.9 per cent for February and March, respectively. Toward the middle of the report period all furnaces were changed to a 450 C maximum cycle and the preheaters were put back in service at a reduced exit gas temperature of about 420 C (previously they were operated at about 600 C). Since this change was made the rehydrofluorination rate dropped to 2.6 per cent.

Reduction (Task III)

The average plutonium yield from the reduction of plutonium fluoride powders in Task III was 98.6 per cent. The average yield for February and March was 97.5 and 98.25 per cent, respectively.

Equipment maintenance included the removal of the type 309 stainless steel furnace (No. 3 furnace) and the installation of an Allegheny-Ludlum S-816 furnace. The type 309 stainless steel furnace has been retained as a spare furnace since it functioned satisfactorily while in Task III.

Canned buttons, shipped off-site, have been oxidizing and spalling while in the plastic bags and canned. Since the customer did not weigh the residues in the plastic bags, discrepancies arose between the shippers' and receivers' plutonium accounts. In order to minimize these differences, the buttons are to be observed in the R.M. Line for 24 hours before canning to prevent canning those which tend to oxidize at a high rate; also only buttons having a smooth surface are to be shipped.

Casting (Task IV)

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Machining (Task V)

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Coating (Task VII)

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Final Inspection and Quality Control

RECUPLEX TECHNOLOGY

Construction of the Recuplex facilities in Rooms 221 and 337 of the 234-5 Building is approximately 38 per cent completed. The vessel supports for the three process hoods were installed and erection of the main operating gallery

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was begun. Installation of the transmitter hoods and duct work in the duct level has commenced.

A study has been initiated concerning the feasibility of alternately processing through the Recuplex facility low MWD material for off-site shipment and high MWD material for plutonium recovery and thus permitting, with the concurrent reactivation of Task I, the shutdown of the 231 Building. Preliminary results, for which complete operating details have not as yet been established, indicate that alternate processing of T-Plant product solutions and the 234-5 Building waste materials from Redox solutions at production rates presently anticipated for Recuplex start-up is feasible. Such a processing scheme would involve: (1) the close control of production scheduling through the facility; (2) a rapid and accurate analytical method for control of the low MWD/T material; and (3) provisions for storing an approximately two week inventory of low MWD/T solutions.

234-5 DEVELOPMENT

In a laboratory investigation of variations in the Concentration Building (224-T) process, the following over-all decontamination factors were measured: (1) for the current process ($BiPO_4$ and LaF_3 by-product precipitations and a LaF_3 product strike), β D.F. = 7 and γ D.F. = 65; (2) omitting the LaF_3 by-product strike, β D.F. = 3 and γ D.F. = 30; and (3) for the procedure in No. 2, followed by a plutonium peroxide precipitation, β D.F. = 3 and γ D.F. = 90.

The Task I Reactor was modified to include a tapered shaft and an air labyrinth shaft seal. The tapered shaft operated satisfactorily when its rotation rate was outside the critical range (1200-1500 RPM). The air labyrinth shaft seal is effective when a slight vacuum (1-4 inches of water) is maintained in the reactor.

A 98.4 per cent yield was obtained in the reduction of a plant scale batch of calcium plutonium(IV) fluoride (370 grams plutonium). The salt was precipitated from AT solution. After an attempt to dry the material in nitrogen in a production Task II furnace produced a green powder, the powder was hydrofluorinated to yield a pink fluoride. It is not clear why drying in the line should have produced a green powder whereas laboratory experiments have produced pink powders. Investigations are continuing.

Batch, counter-current operation of Recuplex flowsheet EX-1 (15 per cent TBP in CCl_4; the feed made up from slag and crucible solution and SN-1 which contained oxalic acid; a reflux ratio of 24) with ten extraction, one scrub, and five stripping stages, gave the following results:

1. With 0.225 g/l plutonium in the feed (CAF), a product (CCP) concentration of 17 g/l plutonium was obtained; aqueous and organic waste (CAW and CCW) losses were 0.22 and 0.18 per cent, respectively.

2. With 1.06 g/l plutonium in the CAF, it was necessary to decrease the L/V ratio in the extraction section from 2.57 to 2.34, to prevent excessive losses to the CAW. When the run was interrupted while making this change and the solutions were allowed to stand, a precipitate (probably plutonium (IV) oxalate) was formed in the feed stage and the run was stopped.

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Revised CDS-1104 casting crucibles, were slip-cast and fired at 1750 C. Seventeen were delivered to Operations for evaluation as a possible replacement for the pressed casting crucible now used in Task IV.

The Plutonium Purification and Fabrication Technical Manual is estimated to be 93 per cent complete.

P-10 PROCESS STUDIES SUB-UNIT

The fate of the HAPO 3-X Program with regard to tritium production waxed and waned during the month. The agreements attained with the Commission in the meeting of April 23, 1954, have resulted in decisions to curtail the P-10 Process Studies Sub-Unit.

Process technology was unchanged during the month.

ANALYTICAL LABORATORIES

General Chemical Laboratory

The major emphasis of the laboratory was in support of thorium studies and preparing for Thorex stream samples. The uranium fluorometric method will not tolerate in excess of 700 micrograms of thorium in the 300 mg. sodium fluoride melt; higher thorium concentrations cause low uranium results. It has been determined that high level thorium (such as thorex feed) grossly interferes with the determinations of uranium by the Chromous Sulfate method. This procedure is carried out in a sulfate medium, however, thorium produces such a heavy precipitate that accurate titration is impossible. Other mediums such as by hydrochloric acid, perchloric acid and phosphoric acid have not proven satisfactory. Thorium determined by the colorimetric Thoron method indicates a maximum error of ± 5 per cent with uranium absent. Uranyl ion causes a positive error. Investigations are underway to check separation of thorium and uranium by ion exchange (resin column) methods, prior to analyses by conventional procedures. By authority of A.T. Gifford of the AEC and V. D. Donihee of SF Accountability, the laboratory was relieved of the responsibility of maintaining a theft accountability of depleted uranium samples processed to waste as a measured discard.

Radiochemical Laboratory

Beta spectrometry appears to hold considerable promise as a means of quantitatively analyzing a solution of the mixed beta emitters, Ru-Rh-106, Ce-Pr-144, Sr-Y-90 and Sr-89-Y-91. Resin samples following throughput of pile effluent water were submitted by Pile Technology for as much information as possible about the nature and amounts of activities present. Emitters were identified and abundance estimated by using gamma and beta spectrometry, emission spectroscopy, half-life and cross sections data. A number of pure isotopes were obtained and scanned, thus enlarging the number of standard scans now on hand and placing the laboratory in a preferred position for undertaking a larger variety of additional work of that general nature.

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Spectrochemical Laboratory

The volume of work performed by this laboratory continues to increase. In addition to carrying on the normal laboratory functions, work was continued on the calibration of the Baird Spectrograph and the preparation of uranium standards.

Mass Spectrometry and Water Quality Laboratory

As reported last month some difficulty has been encountered in the analysis of pure oxygen samples on the mass spectrometer. Further investigations show that there is a definite appearance of carbon monoxide, when pure oxygen is introduced into the spectrometer. This is probably from the reaction of oxygen with the hot filament. Other investigators state that the contribution of carbon monoxide to the 28 peak is of the order of 10 per cent of the 32 peak. This magnitude has been observed in our work. It has been concluded from observations made in this laboratory that the contribution of the 32 peak to the 28 peak and the interference with the 14/28 ratio in an air sample is not significant.

Work volume statistics for the Analytical Laboratories are as follows:

	March		April	
	Number of Samples	Number of Det'n.s	Number of Samples	Number of Det'n.s
Research and Development				
Applied Research	1247	2244	1142	2078
Pile Technology	55	562	185	1307
Fuel Technology	38	550	111	1840
Separations Technology	526	620	386	775
Process Assistance	164	1646	248	2302
Others	133	1201	94	691
Total	2163	6823	2166	8993

Standards and Calibrations	March	April
Number of standard solutions prepared	34	52
Stock solutions dispensed	30	40
Number of calibrations performed	62	12
Number of calibrated glassware dispensed	62	15
Number of checked glassware dispensed	77	72
Total	265	191

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INVENTIONS

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

V. R. Cooper

V. R. Cooper - Manager
Separations Technology Sub-Section

VRC:bp

May 13, 1954

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APPLIED RESEARCH SUB-SECTION

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VISITORS AND BUSINESS TRIPS

W. G. Barter and E. W. Rebol, AMP, Cincinnati, visited Hanford on April 1-2 for technical consultations.

C. R. Goetjen and C. B. Robinson, Air Reduction Co., Seattle, visited Hanford on April 20-21 to inspect welding facilities and equipment.

G. W. Watt, University of Texas, spent the week of April 26 at Hanford in technical consultations.

E. A. Leubke, KAPL, visited Hanford April 27-28 for discussion of chemical and metallurgical processing involved in a new reactor concept.

J. Braunstein and R. E. Burns attended the National American Chemical Society Meeting, April 1, at Kansas City Missouri.

R. E. Burns, G. B. Barton, and H. H. Hopkins, Jr., spent April 5-7 at Oak Ridge National Laboratory discussing separations chemistry.

R. E. Burns visited the Savannah River Works, Augusta, Georgia, on April 8-9, discussing separations and waste treatment problems.

G. B. Barton and H. H. Hopkins, Jr., spent April 1-2 at KAPL, and April 7-9 at ANL, Lemont, Illinois, discussing separations chemistry.

W. V. Cummings, Jr., and R. E. Huschen spent April 19-21 at ANL, Lemont, Illinois, to present papers at the annual AEC Metallurgical Conference.

J. J. Cadwell and M. J. Sanderson spent April 19-23 at ANL, Lemont, Illinois, attending the annual AEC Metallurgical Conference, discussing technical problems and MTR scheduling.

M. J. Sanderson spent April 26-27 at National Lead Co. (FMPC), Cincinnati, discussing metal quality.

D. C. Kaulitz spent April 6 at the U.S. Pipe & Mfg. Co., San Francisco, April 5 and 7 at the Lermac Inc., San Francisco, April 6 at the Pacific Coast Eng. Co., San Francisco, and April 7 at the Berkeley Steel Construction Co., Berkeley, to relax specifications on contract for modular gloved boxes and to discuss high temperature equipment.

W. S. Kelly visited the Western Gear Works, Seattle, on April 2, inspecting some cask drawings.

R. H. Moore spent April 28 at the K-25 Site, Oak Ridge, discussing a dry chemistry problem and April 29-30 at the National Lead Co. (Fernald), Cincinnati, to attend the Thorium Metal Working Committee Meeting.

W. V. Cummings, Jr., attended the AIME Conference in Portland, Oregon, April 29-30, where he presented a technical paper.

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ORGANIZATION AND PERSONNEL

Personnel totals as of April 30 were as follows:

	Exempt	Technical Graduates		Non-Exempt	Total
		Permanent	Rotational		
Physics Unit	27	1	1	5	35
Metallurgy Unit	44	0	4	24	72
Chemistry Unit	50	1	2	17	69
Administration	1	0	0	4	5
Total	122	2	7	50	181

PHYSICS

Lattice Physics

The production of 23 in Hanford piles by means of alternating 25-Al alloy (J) and thorium metal (Q) slugs or by enriched natural uranium (Ike) and thorium metal slugs suffers from the disadvantage that the conversion efficiency for 23 is low. It is about 0.57 for the case of the J-Q combination and somewhat lower for the Ike-Q combination, although in this latter arrangement, the combined 49 and 23 conversion is high, being about 0.85.

The chief reason for the low 23 conversion is that, at present Hanford lattice spacings, these two arrangements lead to an in-pile thorium to graphite ratio that is well below the optimum. One is thus led to consider loadings which allow more thorium to be inserted into the pile and thereby to obtain higher conversion efficiencies.

One such loading has been considered in some detail. It consists of a solid thorium slug with a film (2.4 mils thick) of Oralloy (93.4% 25, 6.6% 28) on its surface. The tubes of the pile are loaded along their entire active length with these composite slugs. The pile now contains more than twice as much thorium as a J-Q or Ike-Q pile and the conversion efficiency has risen to 0.82. The investment of 25 per unit of 23 produced becomes smaller. Cooling becomes more efficient on account of the concentration of the heat sources near the cooling annulus. This type of slug and its applications to 23 production is described in greater detail in document HW-31727.

Preliminary values have been calculated for the multiplication constant (k) and conversion efficiency (C) of the K-pile lattice loaded with uranium oxide slugs of density = 9.8. These results are k= 0.97, C = 0.74. More complete calculations are in progress and will be reported upon completion. The case of oxide enriched to the point sufficient to chain react in the K-pile will be treated.

The reactivities of lattices loaded with the 1.66" O.D., 1.10" I.D. hollow slugs have been measured. The values for the dry lattice were reported earlier but are included in the table below for convenience.

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BUCKLING OF HOLLOW SLUG LATTICES

Slug Size: O.D. = 1.66", I.D. = 1.10"

Lattice Spacing	Wet Buckling	Dry Buckling
6-3/16	-1.2	+2.8
7-1/2	+73.3	+103.3
12-3/8	-25.8	+14.4
15	-95.9	-61.4

The values for the 12-3/8" lattice appear to be anomalous since the difference between the wet and dry buckling is greater than for the lattice both next above and next below--a rather improbable situation.

A series of buckling measurements is in progress for lattices utilizing needed information on the various methods of using J slugs in Hanford piles. Although this program is not yet completed, preliminary values of the buckling of several lattices have been obtained. These are given in the table below.

J-N LATTICE BUCKLINGS

Lattice Spacing	Wet Buckling	Dry Buckling
8-3/8	119	150
5-3/16	256	238
5-3/16	284	262

J-SLUG LATTICE BUCKLING

Lattice Spacing	Dry Buckling
8-3/8"	907

The two sets of values listed for the 5-3/16" J-N lattice were obtained by different methods. The reason for the disagreement between these methods is not yet known. Outside the range of this disagreement, however, is the fact that this lattice gains buckling upon addition of cooling water. This result is at first surprising. Natural uranium lattices gain buckling with cooling water when the spacing is less than the cross-over spacing. However, in natural uranium lattices, this effect is ascribed to the resonance capture of neutrons in 28, an effect which is very small by comparison in 25. In this 25 lattice, the increase in buckling of the wet lattice is due not to the resonance capture effect, but to the rather large decrease of slowing-down length which takes place on addition of water to the lattice. This is, in other words, the rather rare case in which the decrease in k is more than balanced by the decrease in neutron slowing-down length, thus leading to a higher buckling. It is seen, then, that it is possible to design safe lattices even in the case in which resonance capture is negligible.

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The buckling of standard slugs in the 3-3/8" lattice was measured in a 4' x 4' x 4' exponential pile. The result is 119 ± 2 x 10^{-6} cm^{-2}. The known buckling of this lattice (from measurements in an 8' x 8' x 8' pile) is 118 x 10^{-6} cm^{-2}. The agreement between the two values shows that measurements in 4' x 4' x 4' piles are correct to within a few units of 10^{-6} cm^{-2}.

Nuclear Physics

The cobalt samples which were irradiated with samples of carbon-12 in the experiment to determine the carbon-12 cross section have been isolated and counted. From the counting rate of these samples, the total integrated flux to which the carbon was exposed can be determined.

A sample of product plutonium was charged into the MTR on April 14. This sample will be discharged about May 19 and will then be counted to determine its Pu-240 content. This experiment will assist in determining the feasibility of selectively burning out the Pu-240 in product plutonium.

The magnitude of the neutron flux at some point in a medium is usually measured by inserting a neutron absorbing foil at that point and subsequently counting the resultant activity. This activity is proportional to the neutron flux impinging on the foil. Because the neutron flux is changed by the presence of the foil, the question arises as to the relative size of the changes in the flux induced by a foil in media of different absorbing characteristics. In order to answer this question, the following calculation has been made: the flux perturbation has been computed for a foil placed in a graphite medium and for a foil on the boundary between graphite and uranium media. It was found that the perturbation differs by less than 0.1 percent in these two cases showing that the effect discussed is negligible in most experimental work. This result is reported in more detail in document HW-31482.

The quantity $\frac{1}{\eta}\frac{d\eta}{dT}$, which is a measure of the variation with neutron temperature of the number of neutrons produced per thermal neutron absorbed, has been calculated for monoenergetic neutrons with the latest cross-section curves available for uranium (BNL-222 and BNL-276). The result is

$$\frac{1}{\eta}\frac{d\eta}{dT} = \begin{cases} -8.4 \pm 0.8 \times 10^{-5}/°C, & 300°C < T < 400°C. \\ -5.8 \pm 0.8 \times 10^{-5}/°C, & 700°C < T < 800°C. \end{cases}$$

These values are in better agreement with other pile data than the value of ca. -20 x 10^{-5} which was formerly obtained from cross sections.

The resonance escape probability and resonance integral have been measured for thorium and thorium oxide in an experiment based on the small-source theory. The results are:

$P(\uparrow_{metal}) = 0.906$ $\qquad$ $\sigma(res, \uparrow_{metal}) = 5.99$ barns.

$P(\uparrow_{oxide}) = 0.914$ $\qquad$ $\sigma(res, oxide) = 7.39$ barns.

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The values of p are for a 6-3/16 inch lattice. More detailed description of this work will be given in a forthcoming report.

Plant Physics

A document outlining the uncertain state of knowledge of the Pu-240 content in product plutonium resulting from high flux exposure has been issued. In this document the Pu-240 content is given as a function of tube power rather than flux.

A production test has been written to irradiate a sample of bismuth fluoride in a production pile. This test will give information on the feasibility of producing low cost neutron sources.

A study of the criticality hazards attendant upon processing mixtures of J and natural uranium or Ike and natural uranium slugs in the Hanford separation plants is being made.

METALLURGY

Irradiation Effects on Uranium

Four preformed tensile specimens which were irradiated at a temperature of 150 - 175 C to an average exposure of 310 MWD/AT (4.5 per cent U-235 burnup) were tested by standard methods in the Radiometallurgy Laboratory. Two of the specimens were tested in the as-irradiated condition and two were vacuum annealed at 400 C for 15 hours prior to testing. The as-irradiated tensile data showed the material to be brittle and that the yield strength increased by a factor of more than two. The ductility, as measured by per cent elongation, was drastically decreased by a factor of fifty after exposure in a Hanford process tube to 4.5 per cent U-235 burnup. The testing of the irradiated-annealed tensile specimen revealed very little recovery of the ductility of the uranium when compared with the unirradiated tensile data, suggesting that structural damage is small in comparison with the "foreign atom" effect caused by fission products. All of the tensile specimens exhibited the typical square fracture of a brittle material. It was also found that the ultimate strength of the irradiated metal was lower than that of the unirradiated uranium. The data are given in Table I.

TABLE I

ROOM TEMPERATURE TENSILE PROPERTIES OF IRRADIATED URANIUM

Specimen	Ultimate Strength (psi)	Yield Strength (psi)	Per cent Elongation
Beta Heat treated Control Specimens (non-irradiated)	104,000	32,000 (0.1% offset) 35,000 (0.2% offset)	17.0
As-irradiated Specimens (310 MWD/T)	75,500 77,500	67,000 (0.1% offset) 76,000 (0.1% offset)	0.36 0.36
Irradiated Specimen given vacuum anneal at 400 C for 15 hours	65,500 65,000	55,000 (0.1% offset) 49,000 (0.1% offset)	0.44 0.54

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The double crystal x-ray diffraction unit has been permanently installed in the laboratory of 327 Building. Studies were conducted on two samples of irradiated uranium which had received exposures of 150 MWD/T and 1000 MWD/T. No line broadening phenomena or diffraction peak shift was observed in the 150 MWD/T specimen. This is an indication that within the limits of the observation, crystal structure damage is not present. However, definite broadening of the diffraction lines were observed for the 1000 MWD/T specimen. The exact type of structural damage of which this is indicative has not yet been ascertained, but it is believed that the presence of large fission fragment atoms in the metal is the principal cause of this distortion. A line shape analysis is presently under way to find the exact type of lattice damage.

The four high temperature specimen assemblies which had been irradiated in B-Pile for 26 hours were sectioned and the condition and alignment of the uranium rod tip noted. The rod appeared centered as desired in three of the specimens, the straight rod operated at a calculated maximum temperature of 800 C and the tapered rods operated at 690 and 900 C maxima. Small chips were missing from the tip of the 900 C rod as though the uranium had spalled during irradiation. The rod of the fourth specimen, a straight rod intended to operate at a calculated maximum temperature of 550 C, appeared to have warped against the side of the annulus. Further radiometallurgical examination of these specimens and longer irradiations of similar specimens are planned.

Fuel Element Studies

Three uranium-magnesium fuel elements using uranium in the form of small cylindrical punchings have been fabricated and machined to standard four-inch slug size. These are currently being tested by the Experimental Physics group. Closer examination of other uranium-magnesium compacts showed only about 50 per cent wetting of the uranium surface. A magnesium-1.4 weight per cent silicon alloy was substituted for pure magnesium and complete wetting of the uranium surface was observed and a bond of considerably better strength was formed. This sample appears to have better corrosion resistance to boiling water than the uranium impregnated with pure magnesium.

The four enriched cored slugs charged in the hot spot in C-Pile in February under PT-105-513-SI are still operating normally, having now accumulated an exposure equivalent to about 600 MWD/T. Plans for a supplement to the production test to increase irradiation time to 1000 MWD/AT have been changed to continue the irradiation until a rupture occurs in the tube. Since the tube contains 20 normal eight-inch solid slugs, rupture could occur either in the normal solid slugs or in the cored enriched slugs.

Cored slugs are currently being investigated in the hope of producing a fuel element having significantly reduced thermal stress failure probability. It appears possible that a further gain might be made by introducing an insulating layer between the slug and jacket to increase the average uranium temperature during irradiation. This increased temperature of operation may act to anneal out part of the radiation damage effects which cause dimensional instability and/or reduced ductility. Initial investigation is directed toward producing a cored slug, jacketed in aluminum with a layer of anodized aluminum adjacent to

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the uranium. Several cans have been anodized on the inside with a 4-5 mil layer of "Martin Hard Coat". The anodizing conditions of 15 per cent H_2SO_4 electrolyte, 5 amps/sq.ft., and low temperature produce a dense, black, adherent coating which appears to be quite uniform radially but to increase in thickness toward the top of the can. This variation can probably be avoided by better control of electrolyte temperature. A pressure weld will be attempted to weld the cap and can, after sizing the can onto the slug. This must be accomplished without flowing any large amount of aluminum oxide into the weld and without deforming the axial hole in the slug.

A survey of physical, mechanical, and chemical properties of uranium dioxide has been made and is being prepared in rough draft form in connection with a feasibility study of this material for fuel element fabrication. Operation of a 1.36-inch diameter solid uranium dioxide fuel element at but 30 kw/ft would suffice to melt the core. In fact, the oxide would break up at a much lower specific power; the circumferential thermal stress would exceed the ultimate strength of the material above 2.5 kw/ft. A more favorable fuel element from a specific power standpoint involves UO_2 pellets of near theoretical density in a matrix of aluminum, magnesium, or zirconium. This case is being investigated further.

A simple method is desired for fabricating uranium oxide-containing fuel elements of various designs to permit reactivity and conversion ratio measurements. Tamping powdered UO_2, UO_3, or U_3O_8 gives unacceptably low densities of 4.5, 3.0, and 3.6 gm/cm^3, respectively, and sintering facilities are not available on site for producing high density uranium oxide. Accordingly, a mock uranium dioxide has been proposed and is being prepared for 305 Pile test, consisting of a pressed mixture of uranium metal chips and a material such as MgO or Na_2UO_3 to provide oxygen duplicating the neutron scattering effect of oxygen in UO_2.

It has been suggested that a machined notch in a slug would serve as a stress raiser whose effect would be calculable and which would induce split-type ruptures reproducibly and more quickly than would uncharacterizable, naturally-occurring defects in metal. If this is true, then other aspects of metal quality could be studied by use of notched specimens. Accordingly, two uranium specimens with longitudinal V-notches of standard Izod geometry were run in the induction cycling apparatus in cooperation with Fuel Technology personnel. Cracks developed in the notches after a much smaller number of cycles than has been the experience of Fuel Technology personnel with material containing naturally-occurring defects such as striations. Consequently, notched specimens are being prepared for irradiation in the MTR and notched companion pieces prepared from the same rod will be subjected to induction cycling.

A variational method has been used to derive formulae for calculating thermal stresses in an externally cooled fuel element as a function of outer diameter and core diameter, specific power and coolant temperature. These formulae have been evaluated for 1.36-inch outer diameter fuel elements operating at 50 kw/ft in 105 C outlet pile coolant temperature. The maximum circumferential tensile stress of a solid fuel element is 43,800 psi; on curing, this maximum stress is reduced by 19, 26, and 40 per cent for increasing core diameters of 0.272, 0.544, and 0.816-inch, respectively. Detailed results of this analysis with formulae for further calculations will be published shortly as HW-31681.

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Uranium Alloys

Post-irradiation measurements of the uranium-chromium alloy specimens which were irradiated to an exposure of approximately 130 MWD/T have been completed. The per cent change in length of these specimens ranged from 0.3 per cent for the beta heat treated control specimen containing 0.0 per cent chromium to 16.8 per cent for one sample containing 0.61 atomic per cent chromium. The dimensional instability of alloy specimens which were irradiated in the same container was similar. There was no apparent relationship of the per cent changes in length of similar specimens which were contained in separate cans. A review of the data collected indicates that chromium additions up to 0.81 atomic per cent has little effect on dimensional instability and that the instability of fuel materials is very dependent upon pile conditions and the temperature of irradiation.

Zirconium Metallurgy

Slow-bend tests on Zircaloy-2 coupons containing pressed-in notches on the tension side indicate that any one of a number of criteria may be used as a measure of embrittlement. These criteria include energy absorbed in bending before fracture, angle of bend at fracture, and the ratio of the ductile fracture areas to the cleavage fracture areas. This type of test using a Tinius Olsen stiffness tester is adaptable to remotization for use on irradiated specimens. Use of this test instead of standard V-notch Charpy tests also permits a large economy in zirconium, in-pile test facility space, and specimen preparation cost.

Continued length measurement of Zircaloy-2 specimens heated in air indicates that, although slow, growth actually occurs below 600 C, requiring revision of the threshold temperature concept. The growth rate equation applicable continues to be of the form: per cent growth = k(time in hours)$^{1.5}$. Determination of k as a function of temperature over the range 500-600 C has given an approximate activation energy for this growth process of 38 kilocalories/mole and, hence, permits extrapolation to the lower temperatures of contemplated operation. Such extrapolation predicts a 0.1 per cent growth in eight months at 400 C and 0.1 per cent growth in three years at 350 C; also predicted are a one per cent growth in three years at 400 C and a one per cent growth in 15 years at 350 C, provided the same mechanism of growth in air applies at these lower temperatures.

Zirconium specimens from the same rods as was used in an in-pile test wherein washers of zirconium were exposed at an estimated 1000 hours at 450 C (HW 31121) have been vacuum annealed 250 hours at 450 C. The hardness change produced by this treatment is similar to the hardness change observed in the irradiated specimens whereas extrapolation from the scanty information available in the literature suggested such annealing would have produced dead-soft material. Zircaloy-2 specimens that were annealed along with the zirconium showed an increase in hardness which can be attributed to a precipitation hardening effect.

MTR Fuel Element Testing Facility

Experiments with the mockup of the MTR test facility have been completed by Pile Technology Sub-Section. The apparatus is now being disassembled for shipment to Arco. Six A-blocks have been fabricated and are ready for loading. Two shipping

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crates for A-blocks have been constructed. The machining of fuel element specimens for the first three experiments is almost complete. Canning of the specimens will begin shortly. Three A-blocks will be charged with specimens and shipped to Arco during May. As a result of discussions with the MTR policy board in Chicago, it has been decided to utilize position A-40 in the MTR reflector for the first experiment rather than A-39. The estimated power generation in the latter is 100 kw/ft whereas in the former it is estimated to be 75 kw/ft. An attempt is being made to determine experimentally the flux depression to be encountered in the A-block in the MTR reflector in order to be able to better estimate power generation from maps of the unperturbed thermal neutron flux in the MTR. An A-block, charged with specimens and with flux monitors distributed throughout the assembly, was irradiated in the 305 Pile, and subsequently the activity of the monitors determined. Activity values were obtained for 55 locations in the A-block. The unperturbed flux in the 305 Pile will be measured when pile time is available. When this is done, the flux depression may be determined. From the data obtained so far it can be said that (a) end effects due to using only a one-foot charge are less than if a longer column of specimens were to be used, and (b) no radial asymmetry of thermal neutron flux due to the asymmetry of the A-block was detected.

Metallurgical Techniques

The autographic in-pile dilatometer is being calibrated for use in the measurement of in-pile coefficients of thermal expansion for reactor materials. As currently constructed, with a quartz rod as the standard leg, a stainless steel rod as the temperature indicating leg and the material being investigated as the other tripod leg, the dilatometer has a mechanical magnification of 8.86, a resolution of better than 0.005 per cent expansion, and a temperature range of operation of 450 C. The coefficient of linear thermal expansion of a Zircaloy-2 rod has been measured ex-pile as 6.1×10^{-6} over the range 0 to 300 C.

Radiometallurgical Examination

A metallurgical examination of the Ike slug from PT-532-A3 which had been irradiated at a power level calculated to heat the center of the slug above the alpha-beta transformation temperature of 660 C was begun. Transverse and longitudinal sections were cut and electrolytically etched in a 10 per cent solution of HNO_3. Macro-examination of these samples revealed that there were no voids. However, numerous small cracks were seen along the central axis of the slug and an etch pattern showed a possible alpha-beta transformation area approximately 3/4-inch in diameter. Metallographic examinations of these cracks and of the possible phase change areas are now in progress.

One Ike slug was examined from PT-532-A-2 that provided local boiling of the water at the end cap of an enriched slug which had been canned with a thin cap. An indent in the can wall which ran the full length of the slug gave a "worm" track appearance. A transverse sample of the slug revealed that a fine crack existed in the uranium beneath the indent in the can wall. The crack extended into the uranium along a radius for about 1/2". No gross inclusions or any other evidence of abnormal metal quality could be seen. Metallographic examinations of the can wall and the crack are now in progress.

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The examination of rupture #283 from a production test to evaluate the rods rolled at Fernald was completed. A crack 3" long and 1/10" deep was observed to exist in the plane of the fracture and evidently existed at the time of canning. A report is in progress.

Two slugs which had been fractured by the Fuel Examination Sub-Unit were received for examination. One slug, which fractured at a ten-ton load, was from a production test to evaluate the lead dip canning of heat treated slugs, PT-7M. The fractured surface was very uniform and was similar to that of a normal, unirradiated slug. The second slug was a standard triple-dipped slug which fractured when a three-ton load was applied. This slug had a very uneven fracture surface. These fracture patterns are to be correlated with metallographic studies to attempt to explain the difference in breaking strengths.

Radiometallurgy Facilities and Equipment

The new cut-off box was successfully used in obtaining samples from irradiated material. After cutting a number of specimens, waste disposal and the abrasive cut-off wheel changing operations were successfully accomplished. The cut-off wheel was first decontaminated to 5 Rad/hr at 4" before disposal by cutting through a bar of steel.

The metallographic cell was successfully used to prepare samples for x-ray diffraction studies. The solvent degreaser was removed and the electrolytic polishing unit will be removed for alterations. Radioactive liquid waste disposal plans were reviewed and when aspirators become available most solutions will be discarded via the crib waste disposal system. The aqueous insoluble oil now being used as a grinding vehicle is not amenable to the crib system and will have to be collected for separate disposal.

Equipment is now being fabricated to speed up the examination of ruptured fuel elements. A system similar to the one used for disposal of contaminated waste in the cut-off box will be modified for slug examination cell operation. The filter within the cell is now contaminated to 26 R/hr at 1" and 280 Rad/hr at 1" or 3 R/hr at 3" according to recent film studies.

A vacuum annealing furnace, capable of temperatures to 900 C and a vacuum of approximately 10^{-5} mm, was installed in Cell D along with electrolytic cleaning apparatus.

The tensile tester was shielded, air flow control and tensile grips for shouldered specimens provided, and manipulation accomplished to provide pertinent stress-strain data for 1/4" ASTM standard specimens of irradiated uranium without undue radiation or contamination occurring.

Modification of the cathodic etching equipment reached the point where non-irradiated samples of uranium were tested. The cathode is to be placed in a junior cave for further experimentation.

Equipment for making carbon analyses and hardness tests is being collected and cold runs will be made shortly. Macro etching, electrical resistivity and density equipment is being fabricated.

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Separation Plant Corrosion Problems

Several alloys are being studied to determine their corrosion resistance in Redox waste concentrator solutions. Stainless steels type 304L, 309SCb, 347, and Carpenter alloy #20 were exposed for three months as heat transfer units in a scale-up test in the F-4 vessel in the 321 Building. Type 304L appears to have suffered the least corrosion of those alloys, but the corrosion appeared excessive in all cases. Heat transfer units of stainless steel type 312 and 329 and type 75-A titanium are being fabricated for exposure in the same unit for a similar period of time. Welded samples of type 75-A titanium are being exposed in a laboratory simulated waste solution to determine if welded titanium is corrosion resistant in this solution.

Several specimens from one heat (approximately 25 tons) of type 304L stainless steel have been examined in the laboratory to evaluate the severity of a condition which led to fissuring during shearing and/or chipping operations at a fabricator's plant. The heat of stainless steel involved had been rolled to 1/2" plate and a small amount to 1/4" plate, from four ingots cast from the heat. Each of the four ingots was cut into four slabs prior to rolling, making a total of 16 lots of plate from the heat. It had been determined by normal inspection procedures that all the plates involved were satisfactorily resistant to intergranular corrosion, and that it met all the required chemical and physical properties requirements. However, two lots, which upon shearing showed cracks along the sheared edges, were replaced by the supplier. As more of the plate was used in fabrication, necessitating shearing and chipping operations, the cracking became so widespread that an investigation was begun. This investigation disclosed that the phenomenon was confined to one heat, #RO-54164, and affected in more or less degree all of the plate in the 16 lots made from this heat. Two lots were examined in detail, including microscopic and macroscopic examinations of the structure and, in the case of one lot, accelerated corrosion tests to determine the effect of drastic corrosive conditions on the defects. The conclusion was reached that the cracking was caused by widespread laminar non-metallic inclusions oriented parallel with the plate surfaces. The effect was widespread but varied in severity from one lot to another and within the same lot. None of the material was considered of high enough quality for the severe service encountered in concentrators. Accelerated corrosion tests on three specimens from one lot apparently reflected fairly accurately the variation from one location to another within the same plate. One specimen exhibited virtually no attack on inclusions, another moderate effect on inclusions, and a third, severe attack at fissures caused by inclusions.

Plutonium Metal Fabrication

Experimental nitriding of hardened high speed tool steel used for machining plutonium was accomplished during the month. Tools presently used to generate plutonium shapes must be discarded when slightly worn because of the close dimensional tolerances specified for the finished product. Nitriding of high speed tool steel is a method successful in some applications for reducing wear. The present experiments will evaluate the method with respect to plutonium machining. A six mil nitrided layer was produced by heating the steel in an ammonia atmosphere at 525 C for 24 hours. On stress relieved steel, dimensional changes resulting from the treatment were negligible. A modest increase in tool life will easily pay for the nitriding treatment and more importantly will simplify production machining operations.

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Stress rupture tests of welded 309SCb stainless steel to evaluate its performance in simulated reduction bomb service are under way. Test results thus far indicate that welds can be made on 309SCb stainless steel that are satisfactory for high temperature service.

Metallographic examination of electrolytically polished and etched plutonium indicates that this method of specimen preparation does not produce satisfactory or consistent results. Equipment is therefore being assembled to test the feasibility of cathodic vacuum etching of plutonium. The absence of any electrolyte in this method is conducive to improved delineation of dissimilar phases. Concurrently, an in-hood metallographic microscope is being installed to permit specimen examination directly after polishing and etching. With the present arrangement it is necessary to seal the specimen in a special viewing container before metallographic examination.

The apparent crystallite sizes of PuO_2 powders heated to different temperatures have been determined by x-ray diffraction line broadening measurements. A sample heated at 270 C had an apparent crystallite size of 30 Å. Samples heated at higher temperatures had increasingly larger crystallite sizes. A sample heated to 600 C, the highest temperature tested, had a crystallite size of 300 Å. One sample heated to 600 C was off-color, being black in contrast to the reddish brown of the other samples. This off-color sample had a particle size of 90 Å. These particle size measurements are of interest in studies of the chemical reactivity of the powders.

A method for coating plutonium by diffusion of nickel from solution in a liquid nickel-magnesium-calcium alloy is being evaluated using uranium as a stand-in for plutonium. Metallographic examination of the best diffusion coats of nickel on uranium which have been prepared to date has shown the presence of many voids and inclusions. The method appears to be of little value at this stage of development.

CHEMISTRY

Purex

Two countercurrent solvent extraction runs were carried out under Purex 1A conditions to evaluate decontamination obtained at an elevated operating temperature. The conditions consisted in 12 extraction and 7 scrub Mini stages, 30% TBP, and 20% Hanford fission product level. At 50 C the gamma DF was improved five-fold over that obtained at 25 C, this including a 12-fold improvement in ruthenium DF. In a Mini run involving 19 Mini stages, the Purex 1BU was subjected to scrubbing; at 50 C the gamma DF obtained in scrubbing was two-fold greater than at 25 C, this involving an eight-fold difference in ruthenium decontamination.

A review of the Purex analytical requirements shows that existing Redox and Metal Recovery methods are applicable and available in all cases but three. A method for determining nitrite in 1A and 2B feeds has been developed and transferred to the Control Laboratory; a procedure for determining alpha total in organic streams has been established; and a coulometric procedure for determining high concentrations of nitric acid in uranium and plutonium streams is under investigation.

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Thorex

Previous reports discussed investigations of thorium metal dissolving. Similar work was carried out during the month with thorium oxide and showed that in a mixture of boiling 60% nitric acid-0.005 M hydrofluoric acid (optimum conditions), the dissolving rate is 1/10 of that obtained with the metal under optimum conditions. Increased or decreased fluoride concentration retarded the rate of dissolution.

A sample of irradiated thorium has been obtained and will be treated to recover protactinium which will be employed for chemical studies of this precursor of uranium-233.

A flame photometric and a polarographic method for determining low concentrations of uranium have been developed. Similarly, a combined versene titration technique has been established for determining both thorium and aluminum with high sensitivity in Thorex streams. A review of the analytical methods that appear to be necessary for Thorex research and development show that 14 separate methods are established and that eight others are still receiving attention.

Zirconium-Uranium Alloy Dissolution

The investigation of methods for avoiding the potential explosion hazard in the dissolving of zirconium-jacketed slugs has proceeded in three directions. Confirming the observation made at other sites, it was found that U-Zr alloy is completely desensitized by fluoride-containing solutions. It was further observed that heat treatment of the alloy at 800 C, and subsequent quenching, yields a surface that is not subject to explosion. The third approach is directed at the establishment of the rate of formation and the rate of destruction of the sensitive material as a function of nitric acid concentration and time, the purpose being to establish optimum conditions for minimizing the hazard. An equation showing the rate of desensitization has been established.

In assistance to the above zirconium investigation, a titration technique for accurately determining small quantities of zirconium has been established.

Ruthenium Studies

Effort during the month has been directed to application of previously developed chromatographic techniques to Redox solutions in an attempt to identify the existing forms of ruthenium. On the basis of the very limited number of tests, it appears that the head-end treatment exerts a marked effect in reducing the organic-soluble ruthenium species. Separate tests showed that both the anionic form and the hexone soluble form are almost completely destroyed by such treatment. Further, it was shown that solid ruthenium -- either precipitated or adsorbed -- appears in appreciable quantities. In two samples of dissolver solution, solid ruthenium existed to the extent of about 1%, and in a third sample it was found that nearly all the gamma activity was associated with a precipitate. Approximately half the ruthenium in HIMO appears to be in the solid form and the bulk of the ruthenium in 1CU appears to be as the solid. It appears that the head-end step is beneficial in controlling ruthenium and should be retained and, further, that greater attention needs be directed towards clarification of the HIMO. Further

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effort is being directed towards analysis of a large number of process samples and towards the study of a dichromate treatment that may control the ruthenium and minimize tetroxide formation.

The introduction of SO_2 during between-cycle UNH boildown of synthetic Purex solution resulted in a ten-fold improvement in ruthenium decontamination in subsequent extractions.

Uranium Oxide Product

Further work substantiated the previous report that flash calcination of UNH is beneficial in producing a UO_3 product of high chemical reactivity. A series of UNH samples of varying size were calcined at 250 C on a laboratory hot plate. A small sample that underwent calcination in 25 minutes yielded a product having a reactivity of 1.56, and a large sample requiring 3-1/2 hours for calcination produced UO_3 of 1.13 reactivity. A nearly linear relationship exists between reactivity and calcination time. Annealing a high reactivity sample at 300 C had a very minor effect. It was shown that both the heat of hydration and the heat of neutralization of UO_3 are directly related to the chemical reactivity. In neither case, however, is the measurement of heat of reaction sufficiently sensitive to constitute a rapid reactivity test.

Waste Treatment

Scavenging treatments were carried out with stored first cycle Bismuth Phosphate waste supernate. Acidification of the sample to pH 8.5 and treatment with nickel ferrocyanide effected a cesium decontamination of 1200 and yielded a solution well below cribbing levels. If subsequent tests with fresh first-cycle wastes yield similar results, Separations Technology plans to recommend routine treatment and cribbing of the 300,000 gallons of waste produced monthly in the T Plant.

Similar tests carried out with Metal Recovery stored waste supernates showed that cesium decontaminations of 1000-fold are readily obtainable and, consequently, that it is feasible to treat and crib such wastes.

Pile Problems

During pile irradiation of uranium, Pu-240 is produced by two paths, namely, the capture of neutrons by Pu-240, and secondly, the capture of neutrons by Np-239 and the subsequent beta decay of Np-240. If the capture cross-section of Np-239 is large, the second path may be appreciable in the presence of a high neutron flux and may limit the pile power in the production of low g/t plutonium. Since this capture cross-section is very poorly known, a procedure has been devised for its determination. A sample of uranium of very low U-235 content will be irradiated. Np-239 will be recovered from the sample and re-irradiated under controlled conditions to produce Np-240. A radiochemical determination of the latter will then allow calculation of the desired cross-section. The experiment is being conducted jointly with the Physics Unit, and preparations are under way to allow the conduct of the analyses in the pile area.

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Two chemical operations were carried out in assistance to the Physics Unit. These involved determination of cobalt in a neutron monitoring specimen and separation of daughters from a sample of thorium.

In-Line Analyses

Previous reports have referred to various aspects of the extensive program for establishing in-line analyzers in the Hot Semi-Works. In summary, this program includes 11 total gamma monitors, each of which also may be employed for determining the gamma spectrum; one plutonium gamma photometer for determining high concentrations; five uranium photometers for determining high concentrations; two uranium polarographs for determining low concentrations; two turbidity detectors to evaluate the extent of dispersion; two pH monitors, one for the waste neutralization and one for the organic cleanup scrub; and one "alpha printer" for determining plutonium in waste. The latter instrument was developed by the Chemistry Unit and is being designed and constructed by the Instrument Unit.

The overall in-line installation may be considered in terms of three component groupings. The first consists of three master program switches, each of which controls the sequence of a group of analyses. The design concept of these units is complete and shop drawings are being prepared. The second grouping includes eight operating panels and the associated analytical recorders. The panels execute the individual steps of one or more analyses, these steps consisting variously of jetting sample degassing, activation of monitor and recorder, discharge of sample, reset, etc. Units have been designed in detail and shop drawings are 60% complete.

The third grouping consists of the individual sensing elements. Design and shop drawings of the gamma monitor are complete and construction of the prototype unit is 20% complete. The associated gamma spectrometer is constructed and on hand for later installation. The source and detector cell of the plutonium gamma photometer have been constructed and mockup tests are under way. One compact disposable uranium photometer cell has been constructed and placed in service in the Metal Recovery Process. The unit has operated satisfactorily and the design judged suitable for use in the Hot Semi-Works. A simple control power source that works off the 110-volt line has been developed to replace the battery source. A compact disposable uranium polarograph cell has been constructed and placed in service in the Metal Recovery Process. However, further attention is being given to the design in an attempt to minimize iron interference and reduce mechanical difficulties. Design of the turbidity unit is 50% complete. A suitable pH cell has been constructed and placed in service in the Metal Recovery Process. In-line results agree to ± 0.3 pH units with the laboratory results and samples for the latter have been discontinued.

Separate reports were issued during the month presenting the data and specifications for P-10 Phase One and Phase Two analytical equipment.

Analytical Development

Analytical problems receiving attention during the month include selection of a sample bomb and analytical methods to allow analysis of gases formed in the high temperature-pressure pile "loop"; establishment of a direct mount radiocounting procedure for determining plutonium in Recuplex organic streams; and development of a simplified procedure for determining Am-Cm in process samples. The Hanford

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designed x-ray photometer has been evaluated for various analytical applications and found highly satisfactory and has then been made available to the General Analytical Laboratory for service. Off-site tests involving impurity analyses of uranium oxide and graphite with the echelle grating spectrograph have been evaluated. It is concluded that some increase in the sensitivity of rare earth determinations is obtained and that impurity determinations may be made more rapidly in some cases, since no prior chemical separation is required. The overall benefits, however, are relatively minor and do not appear to bear further attention at this time. The previous report referred to the identification of hydrogen in non-bond areas of canned slugs. Further work has shown this observation to be an error and that the hydrogen observed was apparently formed from reaction of adsorped moisture on the surface with freshly exposed aluminum. Further tests in which this effect was eliminated indicate the absence of any gas in the small non-bond areas. Large blisters formed in slugs processed through the hot press procedure contained essentially pure nitrogen.

Decontamination and Waste Disposal

One million gallons of "retention" level waste from the Works Laboratory Area were processed to ground. Forty thousand gallons of "crib" level waste were transported to 200-W for disposal to "crib"; since an increase in activity approaching 200-W crib limits was noted, it will be necessary to concrete a greater percentage of this waste in the future. Two "cut-off" boxes from Building 327 that required special handling were discarded via the Technical burial ground. Disposal of polishing oil from the Lap Master Slug polishes in the Radiometallurgy Building presents a special problem, and consideration is being given to use of a special cask that opens from the bottom.

Thirty two man-hours were spent doing special decontamination work in cubicle room 1F, Building 222-S. A 10-foot gloved box in Room 96, 3706 Building, was completely sealed and safetied in accordance with the recommendations of R.S.M.U. and the Building and Grounds Engineer, Technical. Removal of two four-foot gloved boxes from 3706 in the near future will complete the neutralization and limitation of potential hazards in areas formerly occupied by the Chemistry Unit in 3706 Building. Laundry service for Building 3741, hot graphite shop, was assumed. All other laundry and building service functions were accomplished in a routine manner.

INVENTIONS

All Applied Research Sub-Section personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during April except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

INVENTOR(S)	TITLE
R. C. Smith	"Canning of Plutonium Shapes by Casting the Plutonium into Nickel Shells and Capping Under Vacuum with Prefabricated Nickel Caps," HW-30755, 2/3/54.

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Signed: F. W. McCaugh

[redacted]
Manager - Applied Research
ENGINEERING DEPARTMENT

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GENERAL ELECTRIC COMPANY

[redacted]

HW-31734

RICHLAND, WASHINGTON . . . . . HANFORD ATOMIC PRODUCTS OPERATION

May 4, 1954

This document consists of _____ pages. No. ____ of _____ copies. Series ___.

MONTHLY REPORT

FUEL TECHNOLOGY SUB-SECTION

APRIL, 1954

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VISITORS AND BUSINESS TRIPS

Name	Date	Address	Purpose
W. M. Cashin A. N. Holden	4/5,6,7/54	KAPL, Schenectady, N. Y.	Fuel element development discussions
J. L. Zambrow	4/12/54	Sylvania Electric Prod. Co., Long Island, N. Y.	To inspect Sylvania material and see results of tests

Name	Date	Address	Purpose
G. S. Cochrane	4/1-16/54	G.E.Co., Lynn River Wks., Lynn, Mass.	Discussions of equipment for the Fuel Element Pilot Plant
		Udylite Corp., Detroit, Mich.	Same as above
		Hanson Van-Winkle Munning Co., Matawan, N. J.	Same as above
		Fenn Machine Co., Hartford, Conn.	Same as above
		Bridgeport Brass Co., Bridgeport, Conn.	Same as above
J. A. Ayres	4/4-15/54	Udylite Corp., Detroit, Mich.	Discuss design of pilot plant; discuss electroplating and corrosion problems
		Hanson Van-Winkle Munning Co., Matawan, N. J.	Same as above
		Reynolds Metals Co., Richmond, Virginia	Same as above
		KAPL, Schenectady, N. Y.	Discuss design of Pilot Plant
		Battelle Memorial Inst., Columbus, O.	Same as above

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VISITORS AND BUSINESS TRIPS

Name	Date	Address	Purpose
R. G. Post	4/4-11/54	Udylite Corp., Detroit, Mich.	Consult with design engineers on electroplating equipment
		Hanson Van-Winkle Munning Co., Matawan, N. J.	Same as above
P. J. Pankaskie	4/5-6/54	U. S. Bureau of Mines, Albany, Oregon	Consultation on metallurgy & hot water corrosion of zirconium
G. S. Cochrane	4/15-16/54	M.I.T., Cambridge, Mass.	Discuss swaging equipment
J. W. Riches	4/16-5/3/54	A.N.L., Chicago, Ill.	Metallurgy meeting
		B.M.I., Columbus, Ohio	Consultations on uranium metallurgy
		National Lead Co. of Ohio, Cincinnati, O.	Same as above
		Mallinckrodt Chemical Wks., St. Louis, Mo.	Same as above
		Ames Laboratory, Ames, Iowa	Same as above
		Bridgeport Brass Co., Adrian, Michigan	Same as above
		N.Y.O.O., N.Y., N.Y.	Metal fabrication discussions
E. C. Wood	4/16-23/54	A.N.L., Chicago, Ill.	Metallurgy meeting & testing discussions
		Ames Laboratory, Ames, Iowa	Same as above
R. W. Benoliel	4/17-24/54	A.N.L., Chicago, Ill.	Metallurgy meeting & discussions of uranium metallurgy

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VISITORS AND BUSINESS TRIPS

Name	Date	Address	Purpose
A. G. Blasewitz	4/17-28/54	A.N.L., Chicago, Ill.	Metallurgy meeting & fuel element development discussions
		M.I.T., Cambridge, Mass.	Fuel element development discussions
		Sylvania Electric Prod. Co., Long Island, N. Y.	Same as above
		Armour Research Foundation, Chicago, Ill.	Same as above
W. T. Kattner	4/20-5/3/54	Bridgeport Brass Co., Adrian, Michigan	Consultation on uranium metallurgy
		B.M.I., Columbus, Ohio	Same as above
		National Lead Co. of Ohio, Cincinnati, O.	Same as above
		Mallinckrodt Chemical Wks., St. Louis, Mo.	Same as above
		N.Y.O.O., N.Y., N.Y.	Metal fabrication discussions
D. F. Snoeberger	4/27-5/3/54	National Lead Co. of Ohio, Cincinnati, O.	Attend thorium working committee meeting
C. L. Frederick	4/28-5/1	Electro-Circuits, Inc., Los Angeles, Calif.	Evaluate vendor's equipment in conjunction with processing Hanford materials.
D. C. Worlton	4/28-5/1	Same as above	Same as above

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ORGANIZATION & PERSONNEL

Personnel totals as of April 30 were as follows:

	Exempt	Technical Graduates Permanent	Technical Graduates Rotational	Non-Exempt	Total
Fuel Assembly Unit	19	--	--	11	30
Fuel Element Development Unit	14	1	--	8	23
Fuel Evaluation	15	--	--	14	29
Coatings & Corrosion	12	--	2	6	20
Testing Methods	8	--	1	2	11
Technical Shops	4	--	--	23	27
Administration	1	--	--	6	7
Totals	73	1	3	70	147

URANIUM QUALITY

Slug Core Characteristics

To obtain the maximum information about the resistance to rupture of uranium slug cores by thermal cycling in the electrical induction unit (woodsplitter), it is necessary to establish the relationship between power input and the slug core temperature. Preliminary results of cycling tests indicate the power necessary to cycle the slug cores from room temperature into the beta phase is between 55 and 65 KW/four-inch piece or 165 - 195 KW/foot. This will be confirmed with slugs containing thermocouples. These data will be used to plot curves showing slug core temperatures at given power input.

Because of the incidence of observed slug warpage in recently discharged irradiated uranium slugs, an intensive program to determine the causes of this warpage has been initiated. Facets to be investigated are orientation, the uneven heat transfer during irradiation as related to control rod configuration, poison column location, and non-uniformity of slug positioning in the tubes. In addition, preliminary studies on the distribution of fission products in selected warped and unwarped irradiated slugs from the same process tube will be made with special shielded equipment as some maldistribution has been reported by Kinderman of Applied Research in what was assumed to be uniformly irradiated material. This facet is being investigated jointly between Uranium Quality, Radiometallurgy, Experimental Physics, and Analytical Laboratories Sub-Units.

Reduction and Casting

Apparently the Mallinckrodt and Fernald plants could increase their production capacities significantly by faster feeding through the fluorination step in the process without affecting the quality of uranium metal produced. Results of metallurgical tests on uranium slugs from selected high and low oxygen green salt parent material indicate that the metal from the high oxygen material is equivalent in quality to normally produced uranium.

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Rolling Processes

The investigation of observed rolling deformation patterns and their relationship to in-pile longitudinal failures has been pursued by testing uranium slugs in the "woodsplitter".

Results of testing both as-rolled and beta heat treated uranium slugs in the "woodsplitter" show that 22 slugs, out of 26 tested, failed in the previously marked node areas which were located ultrasonically. It has been established by marked rod sections received from Fernald that the ultrasonic node peaks lie directly beneath the initial roll to metal contact points. Although beta heat treating appears to eliminate the ultrasonic pattern, the longitudinal failures persist in occurring in the node areas which were marked before heat treatment. Further tests are being made to determine the cause of these observed relationships with the expectation that the knowledge will indicate ways of avoiding or decreasing some of the weaknesses in future slug cores.

Four ruptures at H Pile and one rupture at C occurred in PT-19-M (Irradiation of Triple Dip Canned Uranium from Rods Rolled at Fernald) during the current reporting period at exposures of 900, 809, 759, 450, and 788 MWD/T. Of the four ruptures at H Pile, two are believed to be jacket failures, one a core failure, and one was not classified. The rupture at C Pile has not been examined.

Rupture rates of Fernald and Simonds rolled material show no significant difference at the same exposures.

Cold Finishing to Slug Diameter

Cold finishing processes are being investigated because of the promise of considerable savings that could be effected by cold sizing rather than machining uranium rod to slug diameter. The material cold drawn at various cross-sectional reductions at Bridgeport as reported in last month's Technical Activities Report, should arrive on site by mid-May. Another cold finishing process, "uniskanning", has been used at HAPO to effect cross-sectional area reductions of approximately 15 per cent. Slugs machined from both as-rolled, and rolled and beta heat treated rods have been experimentally "uniskanned" to yield satisfactory surfaces. "Uniskanning" 1.405 inch diameter rolled rod to slug diameter will be attempted in the near future.

Heat Treatment of Uranium

Nineteen control tubes in PT-7-M (Irradiation of Alpha Canned Uranium Slugs from Rods Salt Bath Beta Heat Treated at Fernald) have been discharged at various irradiation exposures since charging in April, 1953. The one control tube remaining in pile is currently at 1104 MWD/T. About 300 supplementary tubes charged in this test have been discharged at approximately 600 MWD/T. There has been, to date, only two ruptured pieces out of a total of 13,700 pieces charged. One of these ruptures, a four-inch slug, in 2184-B, discharged September, 1953 at 414 MWD/T, appears to be a jacket failure. The other rupture, an eight-inch slug in 1087-D was discharged at 1193 MWD/T in April, 1954. This rupture has not been classified because of its complex appearance. Some warpage has been observed in the discharged metal as summarized in the last Technical Activities Report.

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As reported in last month's Technical Activities Report, there were dimensional changes of as much ± (.025 - .050"/4") slug length reported in irradiated PT-6-M material (Irradiation of Lead Dip Canned Slugs Machined from Alpha Rolled Rods which were Beta Heat Treated in the Salt Bath). However, in this test, there have been no ruptures or warpage discovered in 12 control tubes of four-inch material discharged at 600 MWD/T.

URANIUM DEVELOPMENT

Hollow Slugs (Canning by Machining)

Several types of hollow slugs have been tested under cyclic strain induced by a thermal gradient (using the woodsplitter). Resultant shape and dimensional changes indicate that substantial stress relief is afforded by coring a slug. None of the cored slugs split. Fabrication of hollow slugs and companion solid pieces, to be irradiated under a production test, is about 30 per cent complete. These pieces are being made by coring half of an eight-inch beta treated uranium slug and using the remaining half as solid companion metal. Uranium plugs are being heli-arc welded into counterbored recesses in the slug ends to exclude Al-Si from the hole during lead-dip canning. An inside diameter of 0.375 inches is being used in these pieces since preliminary calculations lead to the conclusion that this size results in a maximum stress relief with a minimum loss in reactivity. These should be canned and charged into the piles during May.

Powder Metallurgy Slugs

The pre-irradiation evaluation of 4,000 uranium powder metal compacts is about complete. Additional tensile tests of alpha annealed specimens (600 C, argon atmosphere for four hours) substantiated earlier results in that the ductility of the uranium was increased in about 50 per cent of the samples tested. Woodsplitter tests on pieces which had been salt bath annealed at 600 C for four hours yielded results similar to those found in testing pieces which had been argon annealed. Three salt bath annealed compacts were tested. One withstood 50 cycles without splitting while the other two split transversely at 14 and 5 cycles. Examination of longitudinal sections of these pieces disclosed transverse cracks and a beta transformed core as had been found in previously tested powder metal compacts.

Alpha Extrusion

One hundred forty-four alpha phase extruded beta heat treated slugs have been lead-dip canned for irradiation under Production Test 313-105-31-M, and will be charged the first part of May. An intensive unirradiated testing program of this material has been initiated. Arrangements are being pursued with Bridgeport Brass to alpha extrude uranium slugs with a concentric hole 1/4" to 3/8" I.D.

COMPONENTS

Aluminum Process Tube Development

Recent indications of increased tube corrosion at the higher tube powers and outlet water temperatures now being experienced increases the pertinency of the program which

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nas selected the alloy, 63S aluminum, for more extensive investigation. Tubes of this alloy have been developed in cooperation with ALCOA and are scheduled for in-pile testing which should be fully completed in about 18 months. The strength of the tube is half again that of the present standard 2S aluminum alloy tube and its corrosion resistance as determined by the Flow laboratory tests is superior to that of 2S aluminum. Other tube development initiated encompasses the development of extrusion tubing fabrication technique for routine tube production; the development of tubes employing high purity aluminum alloys as the interior cladding material; and the development in cooperation with ALCOA of the aluminum-aluminum oxide material for application as a high temperature-high strength aluminum tube. Tubes formed by extrusion followed by tube reducing should be cheaper, have an improved rib finish, and a higher strength.

Aluminum Can Development

Additional aluminum alloys have been melted in the recent revised 314 Building Melt Plant and, as a result, alterations are being made to this facility so that superior aluminum ingots can be made. More specifically, corrosion coupons were made from 1/10 wt. per cent beryllium-aluminum and 2/10 weight per cent magnesium-aluminum billets.

To gather similar data on the quality of incoming cans, a cooperative program with the Process Sub-Section on gathering detailed data of can quality has been initiated. This program embraces determining the correlation of some non-destructive testing methods with the evaluation of can quality by successive etching to bring out otherse hidden defects. A random sample of approximately one per cent incoming cans will be investigated insofar as available manpower permits.

Zirconium

Flat bottom drawn zirconium cans were received in this period of which only three out of the thirty received met the maximum crown specification. The cans will permit initial investigation of various canning methods.

The Bridgeport Brass people report that by special cold finishing of the blanking sheet they will be able to apply the presently developed forming methods to produce zircalloy 2 cans which is an alloy variation of pure zirconium that assures more uniform corrosion resistance.

Zirconium Tubes

The final tube reducing to size of four zirconium and two zircalloy 2 blanks by the Superior Tube Company is reported to be imminent.

Forming Operations

Uniskanning

F. B. Quinlan and J. H. Johnson report that designs are nearing completion for two new uniskanning assemblies, a semi-production unit and a precision unit for experimental work, both incorporating improvements over the present equipment. The evaluation of coolants during the uniskanning operation indicates that superior surface finishes may be possible on employing metals

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of widely varying properties, specifically uranium as well as aluminum. The potential application of uniskanning for effecting the cold canning of roughened uranium surfaces according to the George Last anodizing process was indicated by a limited number of tests.

Drawing

A series of drawing dies, punches, and accessories are being designed to permit the cupping and subsequent re-drawing of blanks up to 9-1/2" in diameter and hence cups well over 11 inches in length. Conventional drawing practice will be applied to produce cups for subsequent metal re-working or for initial canning tests. Specifically, reverse re-drawing dies were designed which may provide a means of forming cups for internally-externally cooled slugs as well as a means of re-forming thin blanks into cups without wall reductions and, therefore, the blank thickness will be amenable to MIZ-1 scrutiny for defects and, in addition, thin blank material is usually of higher integrity due to the heavy cold work than is thicker material.

CANNING PROCESS

Lead Dip Canning of Beta Treated Uranium Cores

An anomalous weld bead condition in lead dip canned slugs was recently observed. The "defect" is an Al-Si spike usually about 20 mils in diameter (essentially Al-Si of higher silicon content than the surrounding metal in the fusion zone) that starts at the base of the fusion zone and pierces the bead, terminating at the exterior of the weld. About the time the spikes were detected, it was observed that the lead content of the baths did not level off as in production test canning but continued to rise. In general, the formation of spikes and the associated anodic can wall areas seem to be favored by higher than normal lead concentrations in the canning baths. The occurrence of these spikes, however, has been very spasmodic and unpredictable to date, the number observed per truck varying widely throughout the day. More data are being collected to clarify the situation and the use of Fillerwelding as a corrective measure is being evaluated concurrently.

Examination of the irradiated production test lead-dipped slugs has not disclosed significant amounts of weld bead attack, although an unexplained "ring" at the cap-core junction was observed on most of the slugs examined. Examination of these irradiated pieces is planned in conjunction with the one available cap from the three recent cap failures in lead-dipped canned slugs (P.T. 313-105-25-M). No relation between the abnormal weld bead conditions noted in lead dip fabrication at this time and the susceptibility of eight-inch lead dipped slugs to jacket failure is apparent.

Hollow Uranium Slug Fabrication

A satisfactory welding technique was developed for fusion welding uranium wafers in the ends of hollow uranium slugs. The slugs produced are suitable for jacketing, and standard canning methods may be used for initial evaluation of externally cooled only hollow slugs to reduce the magnitude of the thermal stresses inherent in solid slug cores under irradiation.

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Mechanized Lead Dip Canning

Many of the mechanisms of the 101 canning machine for the machine-fabrication of lead dip slugs are being modified or redesigned to achieve successful operation. Meaningful canning trials on which optimum canning conditions can be based will not be possible until these mechanisms have been adequately modified to operate in the hot metal baths.

CANNING DEVELOPMENT

Mechanical Hot-Press Canning

Approximately 70 four-inch nickel-plated uranium slugs were hot-press canned for bonding and canning studies. The results were singularly marked by blister formation. It was believed that the source of gas was inadequate air removal during sizing. Three subsequent tests,

1. Drilling a hole in the can bottom to minimize the amount of entrapped air,
2. Use of zirconium wafers under the cap and base to act as getters,
3. Use of non-heat treated nickel coatings instead of heat treated coatings,

indicated that this was the case. Apparently the uranium under the porous nickel coatings (non-heat treated) "getters" the entrapped air. When the nickel coat is heat treated, the "gettering" power is reduced by lateral diffusion of the nickel across the pores. Work is continuing in an effort to eliminate air entrapment.

Several hollow slugs were hot-press canned under various conditions to establish the feasibility of the process. The slugs canned satisfactorily with no gross deformation of the hole apparent upon sectioning.

Hot-press canning of the "J" metal shipment of 391 extruded slugs was completed. Of this number, 217 were accepted for pile charging (56 per cent yield). Blistering during the canning operation was reduced from 37 per cent in the previous operation (with cast cores) to 8 per cent with the extruded cores. Poor bonds as detected by the ultrasonic bond test increased from 7 per cent to 19 per cent. Work is continuing in an effort to develop a more convenient method of surface preparation of the components than the brushing with abrasive that will give equally consistent good diffusion bonds.

Thermal Hot-Press Canning

Nineteen four-inch and three eight-inch nickel coated uranium slugs were canned by the thermal hot-press method. Lack of blistering and the results of various non-destructive and destructive tests indicate a consistently satisfactory fuel element. One hundred slugs are being canned by this process for a complete out-of-pile evaluation.

Vacuum Canning

Forty-six nickel plated four-inch slugs have been canned by the vacuum process for possible irradiation in the MTR. An additional two hundred are to be canned for Hanford irradiation.

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DEVELOPMENT EQUIPMENT

Gang Press Prototype for Hot-Press Canning

Forty-six eight-inch pieces were canned during the month on the four-unit pilot model gang press. The adequacy of the die design and the heating system was demonstrated. The mechanical performance of the four-unit block was particularly free from operating difficulties. The major obstacle to uninterrupted operation appears to be in a difficulty in ejecting the three-piece dies from the housings. By proper control of the temperature to which the dies are heated before seating, and by control of the seating pressure, this problem is expected to be resolved.

Fabrication of the 16-unit prototype gang press is proceeding. The unit should be ready for operation toward the end of May.

Pilot Plant

The Phase I construction, building shell of the Fuel Element Pilot Plant - Project CA-546 is estimated to be 85 per cent complete. Completion is expected by the penalty clause date of May 22, 1954. The bid assembly for the Phase II interior construction was issued April 16. Bid opening is scheduled for May 14, 1954. Specifications were prepared and bids reviewed on various equipment items for the pilot plants including the plating equipment, swaging equipment, machine tools, salt bath equipment, and laboratory items.

FUEL EXAMINATION

Approximately 30 per cent of the slugs from two control tubes of the Production Test 25-M designed to further evaluate lead-dip canning were found to be warped to as much as approximately 50 mils. No difficulty was experienced, however, during the discharge of the metal from these tubes. In addition, practically all of these slugs in these two tubes contained a well defined line around the periphery of the jacket at a point adjacent to the cap - uranium junction. The cause of this line is being investigated.

Testing of the contour projector was completed. This device will project the image of the edges of irradiated slugs with 50X magnification onto a translucent screen and thus give measurements of diameter, warp and distortion. Installation of this equipment into the 105-B facility was in progress at month's end.

TESTING

Eddy Current Instruments

New probes designed for light weight and fast response to surface irregularities have been built for the Al-Si penetration equipment. The existing MIZ-1 equipment is being modified to use these probes. An intensive effort is being made to assemble this equipment together with a simpler, cheaper, and more rugged conveyor into an instrument for use in slug manufacturing lines. It is planned to be ready early in May for separating slugs to be irradiated to high exposure levels. Also the MIZ-2 instrument

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for bare slug testing for cracks and inclusion will be made ready for prompt use in the manufacturing lines. It must be understood that both of these models are prototypes and not fully engineered production type instruments.

New models of both instruments are designed, most of the parts have arrived, and shop construction will begin next month.

Mechanical Conveyors

The continued search for a cheap conveyor, rugged enough to withstand heavy use and easy to maintain has produced a radically different design. The conveyor consists simply of two driven rolls with their axes slightly skewed. Over short distances this produces the desired motion of a slug laid between rolls. The new design is so much simpler than any now in use that its use in all future tests requiring helical scanning is contemplated.

Ingot Test

Arrangements have been made to field test the ingot defect detector at Mallinckrodt during the week of May 17.

COATINGS & CORROSION

Corrosion

The Flow Cup Laboratory tests at temperatures under 100 C are continuing. The equipment for extending these tests to 150 is almost ready. The data are being correlated with the polarization studies to determine whether or not galvanic studies of aluminum corrosion are of any practical value, at least as far as the study of corrosion of aluminum in the pile is concerned.

The first two discharges of the pieces from Production Test 105-29-M have shown that for low exposures, thermogalvanic corrosion is of little or no importance. The maximum exposure was approximately 200 MWD, and the maximum temperature was approximately 70 C.

Some eight-inch slug cans on heat treatment developed large grains, many penetrating the can wall. This may lead to serious corrosion problems. Further tests are being conducted to determine the extent of intergranular or differential corrosion.

Tests have shown that in the autoclaving procedure used by Manufacturing, dilution of the tap water by condensed steam results in water of high quality. The film on the autoclaved pieces is comparable to that obtained by autoclaving in distilled water. The results of a production test will determine the relative merits of the films obtained by different procedures.

New types of anodized films have shown increased resistance to hot water. Exposures at elevated temperatures to pile water and deionized water have shown that these films afford protection even after 30 days' exposure. In practically all cases, these anodized pieces suffered less corrosion than the control samples. In addition, the anodized films gave complete protection against mechanical damage during charging.

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Coatings

A complete study of the heat treatment of nickel-plated pieces has been started. This study will determine, first, if heat treatment is desirable; if such is the case, then the best method of heat treatment will be determined. A new furnace for the heat treatment of a large number of pieces has been developed and built.

New designs for electroplating racks are being tried. These improved racks should eliminate contact points on the pieces and should give a more uniform plate. A study of the effect of slug design has shown that a piece with sharp corners cannot be electroplated with a plate of uniform thickness unless an extremely complicated racking design is used. It is much better if the radius at the ends is at least 1/16-inch. Studies of current density and composition of etching solutions have been continued.

Several plated pieces have been canned by differential thermal expansion. In contrast to the hot pressing, this method can apparently utilize slugs with a "medium" etch. This is advantageous, because the relatively smooth uranium surface can be plated with a thinner, more nearly impervious layer.

Hydrogen in Uranium

The new, rapid method for determining hydrogen in uranium has made it possible to analyze a large number of pieces during the past month. The results from these studies have shown that anodizing and plating, even at high current densities, do not add any appreciable amounts of hydrogen to the slug.

INVENTIONS

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

GMcCullough

Manager - Fuel Technology
ENGINEERING DEPARTMENT

GE McCullough:acj

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MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

C. B. Robinson, Air Reduction Pacific Co., San Francisco, Cal., visited here April 19-20 to inspect fabrication shops and obtain technical information on certain fabrication problems.

A. J. Karnie visited the A.E.C. and Phillips Petroleum Co. at Arco, Idaho on April 1-2 to consult with operating personnel on principles and capacities for P-10 "J" slug handling.

E. P. Peabody and C. R. Bergdahl visited the Bonneville Power Administration offices at Portland, Oregon, April 2, to discuss proposed Hanford 230 kv line alteration.

T. H. Edwards visited Seattle Office of the Puget Sound Naval Shipyard, Seattle, Washington April 4-6 to secure information and specifications on electrical cable for CA-512-R.

I. M. Jacobs visited Panellit, Inc., Chicago, Illinois; Weston Instruments, Newark, N.J. to witness and approve factory testing of 105-K temperature monitor equipment. He also visited Nuclear Instruments, Skokie, Illinois and Royson Eng. Corp., Hatboro, Pa. to witness factory inspection of health monitor chambers and venturis (CA-512-R); and the Fischer-Porter Co., Hatboro, Pa. to discuss design details on temperature transcriber (CG-553). He visited Manufacturers Eng. & Equip. Corp., Willow Grove, Pa. to evaluate design information on gamma monitor spectrometers; and Argonne National Lab., Chicago, Ill. to investigate developments in pile safety and control instrumentation. He also visited the Automatic Temp. Control, Philadelphia, Pa., to investigate developments in pile safety and control instrumentation and the Bristol Co., Waterbury, Conn., to check testing of faulty recorders (Project CA-512-R). Mr. Jacobs was gone from April 7th through May 3rd.

R. T. Jaske visited the Wapato Lions Club, Wapato, Wash. on April 12 to give a talk on the development of Richland.

E. J. Barrett visited the Ohio Crankshaft Co., Cleveland, Ohio on April 12 - 15 to discuss details of Frost Test Machine.

R. K. Bollinger visited Ajax Engineering Corp., Trenton, N.J. on April 13 through 17 to investigate instrument design details. He visited Metalwash Machinery Co., at Elizabeth, N.J. and the Udylite Corp., Detroit, Mich. regarding Project CA-514.

E. P. Peabody, A. J. McCrocklin and D. S. Baker visited General Electric Co., Schenectady, N.Y. on April 18 through 25 to make an AC Network Analyzer study of the Hanford 230 kv electric system.

E. L. Armstrong and C. Pursel visited the Argonne National Laboratory, Chicago, Ill., the University of Minnesota, Minneapolis, Minnesota, and Knolls Atomic Power Laboratory, Schenectady, N.Y. on April 19th to 25th regarding reactor development problems.

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O. H. Pilkey visited the State College of Washington, Pullman, Wash. on April 22nd to present movie and talk to engineering students of five major Pacific Northwest Colleges.

J. C. Wood visited Pacific Oerlikon Co., Tacoma, Wash., on April 26 to May 1 to begin tests on charging machine. He also visited the Western Gear Works, Seattle, Wash to obtain equipment and the Huntington Rubber Co., Portland, Oregon to discuss silicone seal fabrication.

L. E. Kusler visited the Industry Controls Dept., GEL, and Mfg. Services Div. at Schenectady, N.Y. and the Ajax Engineering Co., Trenton, N.J. on April 26 - 30 to discuss canning machine control problems and ultrasonic cleaning developments in fabrication methods and material handling, and induction furnace controls and cooling.

R. R. Cone visited the Industry Controls Dept., GEL, Schenectady, N.Y. on April 26 through April 30 to discuss canning machine control problems.

B. R. Elder visited G. O. Carlson and the Electric Boat Company, Coatsville, Pa. and Groton, Conn. on April 25 - 28 to discuss defective stainless steel plate.

E. R. Rudock visited Western Gear Works, Seattle, Wash. and Aluminum Company of America, Seattle, Wash. on April 27th to discuss forging design for new reactor nozzle assemblies.

C. R. Bergdahl visited Wenatchee section of AIEE, Wenatchee, Wash. on April 27th to present an address on "The Electrical Engineer and the Atomic Energy Program".

D. L. Peterson visited Todd Shipyards, Seattle, Wash. on April 30 to consult with vendor on fabrication difficulties.

ORGANIZATION AND PERSONNEL

Personnel Statistics:

	March 31			April 30		
	Exempt	Non Exempt	Total	Exempt	Non Exempt	Total
Design Management	2	1	3	1	1	2
Process Engineering Sub-Section	61	12	73	61	12	73
Design Planning Unit	18	13	31	18	13	31
Design Engineering Sub-Section	87	12	99	86	12	98
Drafting Unit	8	90	98	8	92	100
Total Section Personnel	176	128	304	174	130	304
Technical Graduates (Rotational)	-	2	2	-	3	3
TOTAL	176	130	306	174	133	307

Accessions - 7
Separations - 6

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GENERAL

Design Section engineering effort for April was distributed approximately as follows:

	Man Months Expended	% of Total
1952 Expansion Program	47.5	29.5
Reactor Plant Modification for Increased Production	20.9	13.0
3X Program - 100, 200 and 300 Areas	14.9	9.2
Other Projects and Design Orders	33.8	21.0
Research and Development	44.1	27.3
	161.2*	100.0

*Equivalent man months expended include 3.6 months of overtime.

Design Section drafting manpower for April was distributed as follows:

	Man Months Expended	% of Total
Design Section	93.1	94.0
Project Section	1.7	1.7
Technical Section	2.7	2.7
Other	1.6	1.6
	99.1	100.0

The drafting production for the month was 437 new drawings, 49 charts and graphs, and 295 revisions. The drafting room average was 4.5 man days per drawing.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering man months expended on research and development during April was distributed as follows:

	Man Months Expended	% of Total
RDS-D-10 Reactor Design Development	8.7	19.7
RDS-D-11 Water Plant Design Development	5.2	11.8
RDS-D-12 Separations Design Development	13.5	30.6
RDS-D-13 Mechanical Design Development	10.3	23.4
RDS-D-14 Utilities and Services Design Development	1.5	3.4
RDS-D-15 Engineering Standards and Materials Development	4.9	11.1
	44.1	100.0

Research and development Program Proposals for FY 1955 were completed during the month.

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RDS-D-10 and D-11 - Reactor Plant Development

Two new studies were initiated during the month relating to existing reactor plants. These were a study of increased power levels by major increases in effluent coolant temperatures and a study of a reactor disaster safety system.

Network analyzer studies were performed at Schenectady during the month. The purpose of the study was to determine load flows, short circuit capacity and voltage variations on the 230 kv Hanford loop when carrying or supplying additional power.

Work was reactivated on the study of reactor piping and process tube assemblies. Emphasis will be placed on the examination of mechanical problems associated with various slugs sizes, and accommodation of in-pile boiling.

RDS-D-11 Water Plant Design Development

The seventh interim report on protective coatings for steel retention basins and effluent lines was issued during the month. The report covered findings of inspections of all three test locations (retention basin, effluent lines and flow laboratory tanks). The Durachlor paint system appeared to be the least affected in all three locations.

Painting of test plates for a second test, similar to the present test was started at the end of the month. Coatings for this second test were selected by "screening" the coatings by actual test and selecting the most promising ones.

RDS-D-12 Separations Design Development

Design effort to assist in the solution of the Redox Plant contamination problem has included the following: ammonia scrubbers for dissolver and neutralizer off-gasses; modifications to the vessel ventilation system to prevent escape of contamination from process equipment; insulation of concentrators to reduce cell temperatures; improved silver reactors for radioactive iodine removal.

The capacity study of the Purex Plant was continued and has progressed through the head-end operations. Calculations of the head-end capacity indicate that metal handling, dissolving, metal solution storage, centrifugation, and HA column feed make-up can be operated at approximately 2.5 times the nominal Purex Plant capacity with existing equipment.

When the two lines of the TBP Plant are placed in series operation, inter-cycle stripping of organic from the uranium solution may be required. An existing tower and evaporator appear to be suitable for this inter-cycle stripping. Auxiliary facilities including pumping and piping are being studied.

Calculations of the air required for good operation of the mechanical lines in the 234-5 Building indicate that the need may exceed the capacity of present equipment by a factor of six. The need for this quantity and extreme dryness is being studied. Combinations of refrigerant cooling and dehumidification, and absorbent type dryers are being investigated to determine the best manner to accomplish the air drying.

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RDS-D-13 Mechanical Design Development

Hot operation and development of the prototype fuel element canning machine continued through the month. Major modification of the turret which handles the can and sleeve assemblies in the bath and the cap feeding mechanism resulted in an arrangement which alleviates the problem of bath material freezing on these devices and interfering with operation. This modification, coupled with an increased preheating time, allowed caps to be successfully assembled in the can without slugs during the latter part of the month. A significant development connected with this modification is the successful use of "Transite" (asbestos fibers bonded with Portland cement) in the canning bath for static parts subject to abrasion.

A program for the development and fabrication of a prototype in-line alpha monitor was started during the month. The proposed development installation in the Hot Semiworks should yield adequate operational data on low fission product lines. Schedules were established for all phases of the program through the prototype installation in the Hot Semiworks. The mechanical detail drawings of the monitor have been completed and a requisition for its fabrication is ready for issue.

Study of the technical aspects of radio frequency heating was continued for application to the problem of welding fuel elements, requiring the accumulation of understanding and working knowledge of high frequency high power vacuum tube oscillators, in addition to the rather special field of eddy current heating and welding.

RDS-D-14 Utilities and Services Design Development

Work continued during the month on the acquisition of all possible information on buried lines, both through examination of maintenance records and currently exposed pipe sections, and the data indicate that corrosion is greatly accelerated in areas where the earth is heated. In addition, it appears that bituminous coatings of the asphalt variety tend to deteriorate after long exposure to heated soil. All drawings and arrangements for installation of a pipe covering testing facility as part of the corrosion study were completed.

RDS-D-15 Engineering Standards and Materials Development

Cost to date for development of engineering standards for the current fiscal year is $40,062.

The following standards and revisions to standards were completed and issued:

C-4-1a - Pipe Handrail - Stairs (new Standard)
DI-C-4-1 - Instructions to Design Engineers for Use of Standards C-4-1 and C-4-1a.

C-4-1 - Typical Steel Platform Railing and Steel Base, Rev. 2
E-5-15a - Turnout - 15' - 0" Switch and No. 8 Frog, Rev. 1
E-5-15b - Turnout - 16' - 0" Switch and No. 10 Frog, Rev. 1

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Work on standards and studies during the month is as follows:

a. Three chapters of the electrical section for the Design Criteria are being prepared and are approximately 60% complete.

b. Three new Civil Engineering Standard drawings are 50% completed.

c. A standard specification for radiographic spot examination of welded joints was started and is 60% complete.

d. A study is underway to make recommendations for a system to identify metal stocks and is 70% complete.

e. Work was started on the selection of a suitable fire retardant treatment for existing wood lift-truck pallets.

DESIGN PROJECTS

Statistics:

Design engineering effort by the Section on projects for the month of April was expended in the following categories:

		Man Months Expended	% of Total
CA-512-R	100-K Reactor	25.8	22.0
CA-512-W	100-K Water Plant	1.5	1.3
CA-513	Purex Separations Facility	8.1	6.9
CA-514	300 Area Expansion	9.3	8.0
CG-551	Expansion of Building 234-5 Facilities	2.8	2.4
CG-558	Reactor Plant Modification	20.9	17.8
CG-562	TBP Plant Modifications	1.0	0.8
CG-573	3X Program - 300 Area	5.7	4.9
CG-574	3X Program - Irradiation	1.1	0.9
CG-575	3X Program - Extraction	8.1	6.9
CG-578	Effluent Water Monitoring Improvements, 100-B,D,F,DR & H	1.4	1.2
CG-585	Oxidizer Off Gas Treatment, Redox	0.9	0.8
Major Projects - Other than Expansion Program		24.2	20.7
Minor Projects and Design Orders		6.3	5.4
		117.1*	100.0

* Equivalent man months expended reflects 3.6 man months of overtime.

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CA-512 - 100-K Area Facilities

Design activity on 100-K Reactor Facilities consisted mainly of the following items in support of construction: bid review, drawing revisions, review of vendor drawings, the preparation of construction as-builts, and design liaison with the field.

A meeting was held with the relaying and system engineering personnel of the Bonneville Power Administration concerning the modifications for the Hanford 230 kv electrical distribution system. The system arrangements, calculations and analyzer studies were satisfactory with BPA and one alternative was indicated as being preferable. A project proposal for the first capacity increase of the 230 kv System was completed and submitted to the Appropriations and Budget Committee.

CA-513 - Purex Separations Facility

Design of the Hot Semiworks Conversion is 100% complete, an advance of 2% during the month. This does not include the waste self-concentrator. The 147 drawings which were made were comprised of the following: Technical Section, 61; instrument, 30; architectural, 7; mechanical, 40; and electrical, 9.

Work was started during the latter part of the month on the detail design of Purex low-pressure nitric acid fractionator facilities. The work will include requisitions and acceptance test procedures and is proceeding on the basis of lump sum construction. A tentative design completion date based on 60 drawings was established as of September 1, 1954.

It was decided to coordinate the efforts of Projects CA-513-A and CG-558 in supplying raw water to the separations areas from the reactor areas. As a result, procurement costs and duplication of construction effort will be minimized.

Other assistance given during the month concerned the investigation of a "dirty" heat of stainless steel which is being used in the fabrication of Purex concentrators and silver reactor heaters. The tolerances for the cooling annulus between tube inserts and finned process tubes used in the condensers of the Purex dissolvers were established.

The problems of eruptions in the Redox waste tank farms have been studied and alternatives of handling similar problems in the Purex Plant were developed. It was decided that it is economically advantageous, now that additional capacity is needed, to take a loss on the cancellation of surface condenser facilities and turn to the use of the contact type.

CA-514 - 300 Area Expansion

Detail design of the 300 Area Expansion Program was advanced 6% during the month to 90% complete. The scope was changed to the use of water instead of steam for the autoclaves and will delay instrument and electrical design completion until about June 15, 1954. Resultant 20 day extension in ready-for-use date is compatible with production requirements. Additional scope changes to Project CG-573 will delay start of detail design on the conversion of 3706 Building part of CA-514 until May 17, 1954.

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Revised drawing and progress schedules will be issued shortly. Information continues to be lacking on the major process machines. Preliminary arrangement of the final inspection area was approved. A schedule of acceptance test procedures was issued for approval. The design of the acid, caustic and methanol facilities was completed during the month.

CG-535 - Redox Capacity Increase, Phase II

Final design for Redox Capacity Increase, Phase II, was advanced 1% during the month to 94% complete. Three drawings were completed and approved during the month and six existing drawings were revised.

CA-539 - Redox 241-SX Tank Farm

Over-all design for the 241-SX Tank Farm is approximately 99% complete, an increase of 1% during the month. All additional drawings required for the manifold condenser installation have been completed and issued for comment. Two of these drawings remain to be approved.

CG-549 - Activate Task I, Building 234-5

Design work on the Activation of Task I, Building 234-5, was advanced 4% during the month to 99% complete. Twenty drawings were completed and approved during the month making a total of 120 drawings approved to date out of 125 required. The remaining five drawings are out for comment.

CG-551 - Expansion of Building 234-5 Facilities

Design work on Expansion of Building 234-5 Facilities is 99.1% complete, an increase of 4.1% during the month. All drawings have been completed and approved. Remaining work consists of the preparation of acceptance test procedures.

CG-558 - Reactor Plant Modification for Increased Production

Over-all design on Reactor Plant Modification for Increased Production was advanced to 15.6% complete. Detail design was increased 4% during the month to 11% complete.

Considerable effort was directed toward the preparation of an integrated design, procurement and construction schedule. The scoping schedules of the 100-F and 100-H plants was revised to reflect limited modifications and the scope completion date is estimated to be August 1, 1954. Scope information and a cost estimate were prepared for a project proposal to cover minor portions of the 100-D and 100-DR plant construction which should be made during the 100-DR shutdown for the horizontal rod installation. Design criteria for the 100-B and 100-C plants were issued for comment.

A preliminary material and equipment list was issued the first part of the month. Procurement specifications and drawings were approved and issued for the secondary pressure monitor panel for all areas covered by this project. The pump arrangement plans for the 100-B and 181-D Buildings have been delayed pending the breakdown of work between Projects CA-513-A and CG-558. This question was in the process of being

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settled at the end of the month. A design is being prepared to provide cooling for the new 900 HP motors.

A firm definition of the site clearance work was established for the 190-B and 190-DR Buildings and relative electrical drawings were started. The drawing showing the relocated 36 inch process sewer for the 100-B Area was issued for comment. Three drawings showing the 105-B biological shield thermocouple step-plug and neutron detector were issued for comment. Specifications for the 13.8 kv switchgear required in the 151-B substation, together with five associated drawings were issued for comment.

CG-562 - Waste Metal Recovery Plant Modification

Design of the solvent recovery system of the Waste Metal Recovery Plant is 100% complete, an advance of 2% during the month.

CG-573 - Hanford 3X Program - 300 Area

Over-all design of the Hanford 3X Program - 300 Area is 66% complete, a reduction of 18% from last month due to a process scope change from hot press canning to dry canning. Therefore, bond test, sonizon, irridite process, and central can and cap preparation will be used only for the 313 Building part of this project.

CG-574 - Hanford 3X Program - P-10 Irradiation

The entire 3X Program has been reduced in scope and work on CG-574 was suspended.

CG-575 - Hanford 3X Program - P-10 Extraction

The 3X Program was redirected on a curtailed basis toward the provision of slight modification to the existing temporary facilities to process the present reactor loading, but excludes isotopic enrichment, "hydroside" - forming, and development facilities.

CG-578 - Effluent Water Monitoring Improvements - 100 B, D, DR, F and H Areas

Design of the Effluent Water Monitoring Improvements - 100-B, D, DR, F and H Areas was advanced to 5% complete. The drawing schedule and material and equipment list were issued. The construction specification for the spectrometers, the turret assembly drawing, and the sample rooms equipment and piping arrangement drawing were issued for comment.

CG-581 - P-10 Development Facility

Authorization for design of a P-10 Development Facility was received during the month. However, this work was suspended before design was started.

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CG-585 - Oxidizer Off-Gas Treatment, Redox

Authorization was received and design was started during the month on oxidizer off-gas treatment equipment for the 202-S Building J-cell. Approximately 25 drawings are required. Five drawings were completed and design was approximately 35% complete.

D.O. 100549 - Redox Back-Cycle (CG-182-D-II)

Design on the Redox Back-Cycle was advanced 2% during the month to 62% complete. One drawing was completed and approved during the month.

D.O. 100688 - Solvent Building

Design is 100% complete, an advance of 80% during the month. Two drawings were approved.

D.O. 100750 - Project Proposal - Modification 100-C Reactor Plant

Preparation of a project proposal for 100-C Reactor Plant alterations was delayed for budget work.

D.O. 100752 - FY 1955 and 1956 Plant and Equipment Budget

The budget data sheets for the Plant and Equipment Budget for FY 1956 and Revision of FY 1955 were being revised during the month.

D.O. 100754 - Modification of the 189-D Process Tube Mock-Up

Design of the modification of the 189-D Process Tube Mock-Up was advanced 5% during the month to 35% complete. Five drawings were issued for comment. Lack of information on procured equipment is retarding detail design and layout.

D.O. 100755 - Hot Semiworks Purex Self-Concentrating Waste Storage Prototype

Design work on a self-concentrator tank and associated piping and accessories for the Hot Semiworks is approximately 75% complete, an advance of 30% during the month.

D.O. 100757 - "As-Built" Area Maps

Drafting is continuing on the revision of Hanford project maps to bring them up to date. Of the 388 estimated drawings, 55 have been started.

D.O. 100765 - Cell Air Cleaners - Redox Production Plant

Design work on a new Redox cell ventilation unit is approximately 75% complete, an advance of 15% during the month. Design changes requested by the Manufacturing Department have resulted in a delay of the design, but it is estimated that detail design will be completed by May 14, 1954.

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D.O. 100778 - Physical Constants Testing Reactor - Graphite Component Design

Detail design of the graphite components for the Prototype Constants Test Reactor was advanced 10% during the month to 75% complete.

D.O. 100781 - Scope Design for Replacement of UO_3 Nitric Acid Fractionator

Based upon preliminary study and recommendations of the Design Section, the request of Manufacturing Department was changed to require a design of a fractionator for use under future needs and methods of operation. A process diagram was issued for comments. Design is 15% complete.

D.O. 100822 - Shielding Screen for Central Viewers - 105-C, DR & H

Design was started on a method of protecting central viewing windows from impact of solid dummies discharged from the reactors in 105-C, DR and H. A viewing window shield drawing applicable to all three areas was completed and submitted to the Manufacturing Department for approval.

D.O. 100825 - Silica Gel Tail-End Treatment - Redox Phase II (CA-535)

Authorization was received during the latter part of the month to proceed with design work for the Silica Gel Tail-End Treatment.

D.O. 100826 - Television Installation in 105-B Building

Scope design on the television installation in the 105-B Building was continued and two drawings were issued for approval. A cost estimate of detail design and the instrument design engineered items was made. This essentially completes the design work.

D.O. 100829 - 241-SX Waste Self-Concentrator Test Facilities

Design for the test was completed and issued to the field for construction.

D.O. 100832 - Hanford Works Official Telephone Exchange (CA-533)

Review of the architect-engineer's final drawings and specifications is essentially complete.

D.O. 100834 - Particle Problem - Animal Exposure Equipment

Design on the alterations to the 1705-F Building was advanced to 30% complete. The architectural drawings were completed.

D.O. 100845 - 300 Area Water Study

Design was continued during the month on the study of the problem of providing an independent water supply for the 300 Area. A meeting was held with other departments and a preliminary draft of a proposed report is ready for issue.

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D.O. 100846 - General Improvements to Laboratory Area Buildings (CG-576)

Design of the general improvements to the Laboratory Area Buildings was advanced 40% during the month to 90% complete.

D.O. 100848 - Diversionary Outlet from 107 Retention Basins - 100 D & F Areas

Design was started on the diversionary outlets and two drawings were sent out for comments.

D.O. 100849 - Physical Constants Test Reactor Building

Design on a building for a prototype physical constants test reactor is 70% complete, an advance of 45% during the month. Major changes were made in the ventilation system and the shielding doors. These were due to a revised estimate of the electrical loads required in the control rooms and to revised shielding requirements, both as determined by the Technical Section. This will result in a slight delay in the design completion.

D.O. 100850 - Fire Detection and Annunciation Facilities 234-5 Building

Work was initiated on a project proposal to provide necessary fire detection and annunciation facilities in the 234-5 Building.

D.O. 100851 - Metal Loaders - Reactor Charge Elevators

Preliminary design for a metal loading facility for the charge elevators in the 100-B, D, DR, H and F Areas was completed. Preparation of a project proposal was started but delayed for investigation of possible conflict with CG-558.

D.O. 100854 - 713 Building Alterations (CA-561)

Work was started on the detail design, drawings and specifications for lump sum construction of alterations to the 313 Building and is 70% complete.

D.O. 100855 - Sketches for Gallery Equipment (CG-535)

Design was started and sketches of required chemical addition and instrument line changes in the Redox Plant in support of the Phase II expansion were completed. The work was extended to include the preparation of sketches for containers which will be used in the removal of contaminated equipment, discarded during the Phase II equipment changes.

D.O. 100858 - Roof Repair - 221-T Building

Design was started and a drawing and specification for reroofing and flashing the expansion joints of the 221-T Building are being prepared. Design is approximately 85% complete.

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DESIGN SECTION WORK COMPLETED DURING APRIL

D.O. 100473 - Hot Ball Detector, Ball 3X System
D.O. 100516 - Revisions to Print #H-1-42053 - 221-U
D.O. 100630 - Fuel Element Pilot Plant
D.O. 100648 - (CA-534) Bio-Assay Laboratory
D.O. 100767 - Diversion Box Jumper for H-3 Waste (241-S)
D.O. 100768 - Diversion Box Jumper for D-8 Waste (240-S)
D.O. 100773 - Auxiliary Ventilation for Counting Room, 329 Bldg.
D.O. 100775 - Jumper B-2 to L-15, 240-S Diversion Box
D.O. 100777 - Jumpers for Third Spare Line for D-8 Waste (240-S)
D.O. 100783 - Completion of Minor Construction Fabrication Shops (CG-511)
D.O. 100792 - Jumpers for 221-T
D.O. 100805 - D-13 to D-12 Transfer Jet - 202-S
D.O. 100809 - Dissolver Off-Gas Jumper - 202-S
D.O. 100810 - H-7 Agitator Power Jumper - 202-S
D.O. 100811 - Jumper, 153-U Diversion Box
D.O. 100812 - Pulse Generator Inspection Trip
D.O. 100813 - Invention Report Sketches
D.O. 100814 - Jumper #13-32, 221-T Building
D.O. 100815 - Jumper, Section 15, 221-T Building
D.O. 100816 - Jet Assembly & Drop Leg - 221-T Building
D.O. 100817 - Jumper, Nozzles #6 to #12, 153-T
D.O. 100818 - Jumper for H-4 Pot Containing Tube Bundle, 202-S
D.O. 100830 - Lighting Studies - Personnel Meter Gatehouse
D.O. 100847 - Convert White Bluffs Ice House to Electrical Distribution Headquarters

INVENTIONS

All persons in the Design Section engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

R W Beaston
Manager, Design
ENGINEERING DEPARTMENT

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PROCESS ENGINEERING SECTION
ENGINEERING MAN MONTHS

Description	Backlog Start of Mo.	Orders Rec. During Month	Time Spent During Month	% of Total Effic.	Backlog End of Month	Balance FY 54		Sched FY 55				Sched. Bal. FY 55	Ant. Fut. FY 55	Total FY 55
						May	June	July	Aug	Sep	Oct			
CA-512-R	118.3		11.2	17.5	107.1	12	11	11	10	10	9	44.1		84.1
CA-513	18.0		4.2	6.6	13.8	5	4	3	2	1	0	0		6.0
CG-551	5.1		1.4	2.2	3.7	2	1	0	0	0	0	0	-	-
CG-558	30.7	**	5.1	8.0	40.6	5	5	4	4	4	4	13.4		29.4
3X Program	38.6	**	6.1	9.6	18.0	2	3	3	3	3	1	3.0		13.0
RDS Program	138.4		31.9	50.0	106.5	32	32	35	36	38	42		600	600.0
Other major projects minor projects, D.O.'s	14.8	22	3.9	6.1	32.9	4	4	3	3	3	3		36	36
Ant. Future						-	2	3	4	4	4		138	138
TOTALS	363.9		63.8	100.0	322.6	62	62	62	62	63	63	60.5	774	906.5

DESIGN ENGINEERING SUB-SECTION

CA-512-R	98.3	10	12.5	15.9	95.8	12	11	11	10	10	11	30.8	-	72.8
CA-513	25.0	5.0	3.7	4.7	26.3	5	6	6	5	2	1	1.3	-	15.3
CA-514	37.8	-	7.7	9.7	30.1	8	5	3	2	1	-	-	-	6
CG-551	3.4		1.1	1.4	2.3	1	1	-	-	-	-	-	-	-
CG-558	295		13.8	17.5	281.2	16	17	18	19	20	22	169.2	-	248.2
3X Program	153.1	**	6.2	7.9	25	5	4	4	3	3	2	4.0	-	16.0
Other Maj. Projects	84.3	64.0	20.2	25.6	128.0	18	18	16	16	15	14	31.0	-	92.0
Minor Proj. & D. O.'s	17.6	8.0	6.2	7.9	19.4	6	6	5	5	6	6		60	60
RDS Program	33.5	-	7.4	9.4	26.1	8	10	11	12	13	14	-	210	210
Ant. Fut. (Major)						1	2	6	8	10	10	-	281	281
TOTALS	748		78.8	100	624.2	80	80	80	80	80	80	236.3	551.0	1001.3

Present total backlog is distributed over the five engineering branches in terms of man months as follows:

	Auth. Projects FY 1954 & 1955	Ant. Fut. FY 1954 & 1955	TOTALS
Arch. & Civil	123.8	100	223.8
Mechanical	174.6	165	339.6
Electrical	149.9	136	285.9
Instrument	126.3	104	230.3
Standards	49.6	49	98.6
TOTALS	624.2	554	1178.2

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* Includes all RDS, Ant. Future, Minor Proj, D.O.'s and customer work for FY 1955
** Adjusted Backlog

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MONTHLY NARRATIVE REPORT - APRIL 1954

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

After completion of certain portions of the Expansion Program for 100 Areas, all excess employees were re-assigned at HAPO.

Following is a summary of personnel changes in Project Section during the month:

	March 31, 1954	April 30, 1954	Net Change
Employees on Payroll	444	439	-5
Tech. Grad. - Rotational	12	12	0

The end-of-month status involved these changes:

	Project Section Personnel	Tech. Grad. - Rotational
Payroll Additions	6	
Payroll Removals	6	
Transfers into Section	8	
Transfers from Section	13	
Transfers within Section	5	

B. SCOPE OF ACTIVITIES

At the end of the month, construction completion status of major projects was as follows:

Project No.	Title	Scheduled Completion	Actual Completion
CG-496	Recuplex	40%	39%
CA-512	100-K Area Facilities		
	KW - Water Plant	94	88
	Reactor & Bldg.	86	72
	KE - Water Plant	71	60
	Reactor & Bldg.	54	58
	General Facilities	86	75.7
CA-513	Purex Facility, Part "A"	36	36
	Part "D"	55	40
CA-514	300 Area Expansion	31	31
CG-535	Redox Capacity Increase, Phase II	35	29
CA-539	Redox 241-SX Tank Farm	95	92
CA-546	Fuel Element Pilot Plant	10	19
CG-573	Hanford 3X Program - 300 Area		58*

* Work now authorized, which is a portion of proposed project.

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C. CRAFT LABOR

Negotiations with the Carpenters' Union were finally concluded by agreement on Schedule "A" wages based upon recommendations of the Ching Panel. The issue of isolation pay was resolved in a separate letter by which the contractors agreed to include carpenters in any increase negotiated with the Building Trades Council. Picketing of Cisco Construction Company by the Building Trades Council was continued at the south entrance of Richland. The apparent intent of the picketing was to prevent delivery of materials to Cisco. The Teamsters' Union again raised the question of retroactive isolation pay for bus drivers who transport construction workers between North Richland and the construction areas. Potential claims amount to almost $1,000,000.

D. SAFETY AND SECURITY

There were nine regular meetings and discussions of safety, security, and health topics which were attended by about 285 personnel. About 90 other employees of Project Section attended the combined magic show and safety lecture by Mr. Clyde R. Powell. Four regular Monday morning "tool box" meetings were conducted in the field, and seven mass safety meetings were held for G.E. and service contractor personnel. Five safety, security, and health orientations (Special Hazards disclosures) were given to 83 new employees of the service contractor. In Minor Projects Sub-Section, a drive for more effective eye protection has reduced eye injuries about 90 percent.

E. HIGHLIGHTS

Minor Projects Sub-Section

Work on 40 project items and three informal requests represented an estimated total of $16,534,341. The Sub-Section completed assigned work on the following: CG-438, Ball Third Safety System; IR-116 (AECP-138), Combined Civil Defense and Plant Disaster Control Center; and two engineering requests. Eight project proposals were approved by the A & B Committee. Six authorizations were granted by the A.E.C. The Sub-Section accepted initial assignments of work on two projects and eight engineering requests. Important projects now in progress include Recuplex Installation, 300 Area Expansion Program, Fuel Element Pilot Plant, Hot Semiworks Conversion, Hanford 3X Program - 300 Area, and Effluent Water Monitoring Improvements.

Project Auxiliaries Sub-Section

Inspection was completed on 74 orders; 142 new orders which will require inspection were received. At the end of the month there were 1166 current orders for items which require inspection. One heat of 304-L plate which has been partially fabricated in the vessels for Purex has been found to have excessive inclusions of foreign material. Reproduction output was 605,434 square feet for the 20 working days of the period. Estimating completed 44 estimates, including those for 12 project proposals. Field Surveys completed the semi-annual coal inventory, the re-alignment of 190-C pumping equipment, and also several miscellaneous surveys.

Reactor Projects Sub-Section

Power to one pump at 181-KW has been permanently connected, and the five other pumps are being connected. The six pumps at 181-KE have been set but not connected. The endurance test on No. 3 Process Pump Assembly at 190-KW was completed satisfactorily. The boilers and turbine generators in 165-KW were in final stages of installation and testing.

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The equipment installation at the KW Water Plant is being scheduled toward a ready-for-use status of the entire plant for August 15, 1954. At 105-KW, aggregate for the top "B" shield was prepacked, and grouting was begun. The gas leakage test has indicated losses within the minimum requirement of 60 cubic feet per hour. Because of increased difficulties with Threadolets, decision was reached on April 23 to machine those originally ordered for the rear face of 105-KE and KW to provide sufficient acceptable connectors for front face of KE. Procurement problems for 105-KW have been reduced to two items, vertical rod cylinders and horizontal rod tips. The shielding crates for 105-KE were completed, and thermal shielding was placed on the right and left sides. Other installations are being scheduled to meet the proposed packing date of May 10-12. Fabrication of process tubes for 105-KE was started the last week of April. Downcomer fabrication is nearing completion.

Separations Projects Sub-Section

Procurement action for engineered equipment for Purex consisted of approval of 44 requisitions, bringing the total of approved requisitions to 551 of the 580 required. All of the 65 acceptance test procedures have been received, and 40 have been approved. During the month about 7500 cubic yards of concrete were placed in 202-A Building and related structures. Construction of Purex Facility has been accelerated to three full-strength shifts for mechanical phases, including the Pipe Shop. Installation of piping in the Hot Pipe Trench was started on April 14, and installation of vessels TK-104, 106, and 107 in the basement of Aqueous Make-Up was started on April 23. Of the 565 kickplates required, 121 were placed during the month, bringing the total to about 175. The roof slabs of the 202-A Building were complete, and the built-up roofing was about 26% complete. Erection of structural steel in the Service Area was 90% complete. The 272-E Mock-Up Building was ready for installation of mock-up equipment as it was received. The concrete barrel of 291-A Stack was completed April 9, and preparations were made for installation of the stack liner. At Redox Capacity Increase-Phase II, construction work on the 233-S Building was continued under SWP conditions. At the Redox Tank Farm, concrete domes on the remaining nine tanks have been placed.

F. MONTHLY REPORT OF INVENTIONS AND DISCOVERIES

All persons in the Project Section engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge, no inventions or discoveries were made in the course of their work during the period covered by this report, except as listed below. Such persons further advise that notebooks and records, if any, kept in the course of their work, have been examined for possible inventions and discoveries.

NONE

April 30, 1954

J. S. McMahon, Manager - Projects

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II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CG-581 - P-10 Development Facility

Funds have been authorized for the design of a development facility for P-10. The preliminary design and the initiation of detailed design are responsibilities of Design Section, and Project Section is assigned design liaison.

CG-585 - Oxidizer Off-Gas Treatment, Redox

Design was 30% complete. This project is to be performed in two stages. The first stage is to consist of fabrication and installation of five jumpers and a fiberglass filter and the installation of a scrubber; the second stage is to consist of fabrication and installation of 15 jumpers. Fabrication of the filter and jumpers for the first stage has been assigned to Minor Construction and Plant Forces, respectively.

ER A-755 - Study of Classified Scrap Disposal Problem - 300 Area Library

The study was about 40% complete. Before a formal report is prepared, the conclusions are to be discussed with Technical Services Unit to determine the need for an informal reques to provide for installation of the equipment.

ER A-756 - Fly Ash Collection Equipment, Building 384

With scoping 75% complete, the final draft of the project proposal has been prepared for an estimated cost of about $25,000. Detailed design is to be included in a lump sum design and construction contract.

ER A-757 - Temperature Control Improvement - 108-F Building

With scoping completed, a rough draft of the informal request is being reviewed by the interested parties.

ER A-758 - Mechanical Maintenance Shop Centralization - 100 Areas

Scoping was about 10% complete. At the request of Reactor Section of Manufacturing Department, a project proposal is being prepared for centralization of 100 Area Mechanical Maintenance Shops into the 100-H Area.

ER A-1211 - Reactivate Project Proposal for New VSR Test Tower

With scoping completed, the project proposal is being assembled for processing in early May, 1954. A new estimate is being obtained to evaluate any increase in construction costs.

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ER A-1213 - Metal Loading Facility, 105 Buildings

The project proposal is being prepared by Design Section. A work order for preparation of a schedule and the method of performing the work has been received.

ER A-3106 - 300 Area General Improvement Program

A project proposal is being prepared to maintain dust control and prevent errosion by means of grass seeding, surfacing, and cover plantings. This project includes similar work in the Laboratory Area as well as general surface improvements in the entire 300 Area.

ER A-3107 - Hanford Works Laboratory Exceptions

Work Order No. EE-4958-C-20093 has been completed by Plant Forces. Work is progressing on the remaining exceptions.

2. Final Reporting

CG-438 - Ball Third Safety System

This project was closed out April 1, 1954 with exceptions. These exceptions are to be completed by November 1, 1954.

IR-116 (AEC-P-138) Combined Civil Defense and Plant Disaster Control Center

The project was accepted by the Hanford Civil Defense District on April 7, 1954.

ER A-727 - 313 Building Roof Repair or Replacement

With the project proposal about 50% complete, this request was closed out on April 5, 1954. The work is to be resumed at a later date under a new engineering request number.

ER A-754 - Review of Real Property Holdings

The study report was completed and forwarded to Classified Files April 16, 1954. No further work is contemplated unless requested by A.E.C.

3. Current Projects

CA-192 - Remodeling Building 108-F for Biology Laboratory

Completion status remained at design 100%, construction 99%. Installation of the X-Ray Unit was completed April 22, 1954, and installation of the electron microscope was about 50% complete. Several minor pieces of work are also being completed.

CA-431-A - New Reactor - 100-C Plant (Waterworks)

Completion status remained at design 100%, construction 99.9%. Work has been started on the vent connection for the 105-B cushion chamber. Work on the East 107-C tank baffle has been suspended indefinitely because the Manufacturing Department requires continuous use of the tank at this time.

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CA-431-B - New Reactor - 100-C Plant (Reactor)

Completion status remained at design 100%, construction 99.9%. Work orders have been issued to cover all exceptions. On April 29 it was finally agreed to proceed with existing design of outlet connectors. New requisitions were issued on April 30, and it was estimated that delivery can be made within 90 days. Work orders covering the Metal Loading Elevator and Flexowriter Installation were completed.

CA-431-C - Metal Examination Facility - 105-C

Design had been completed previously; construction progressed 1% to a total of 20%. The 1X to 10X periscope has been completed and prepared for installation. Other work must await complete delivery of the hydraulic cylinders. Revision No. 6 of the project proposal was transmitted to the A.E.C. on April 16, 1954. A revised "construction progress schedule" is being prepared.

CG-496 - Recuplex Installation, 234-5 Building

Design had been completed previously; construction progressed 3% to a total of 39%. The construction contractor has erected forms for the slab roof. Installation work in Building 234-5 by Minor Construction is being delayed by slow delivery of critical equipment such as vessels and valves. Work is progressing in the Duct Level on hoods, piping, and duct-work. The mezzanine floor in Room 221 is nearing completion.

CA-512 - 100-K Reactor Facilities

100-KW and 100-KE Water Plants

Overall design of water plants remained at 99.8% complete. Construction progress was as follows: KW progressed 10.2% to a total of 87.7%; KE progressed 8.9% to a total of 59.5%; general facilities progressed 5.4% to a total of 75.7%.

Cumulative totals of concrete placed to date were: KE water area, 79,524 cubic yards; KE water area, 74,814 cubic yards; general facilities 13,226 cubic yards.

Permanent power connections have been made to one pump at 181-KW River Pump House, and the other pumps are being permanently connected. All six pumps have been set at 181-KE, but no permanent connections have been made. At 165-KW, permanent power connections are being completed. The boilers are being dried out in preparation for the beginning of final tests on May 10, 1954. Testing of turbo-generators has been scheduled to begin May 24, 1954. Tubes are being rolled into the third boiler at 165-KE Building, and installation of switch gear was continued.

For the 190-KW low lift water pumps, the cracked pump bowls are being replaced. This replacement began on April 30 with the shipment of one pair of new bowls to be used in No. 4 unit. The endurance test of No. 3 process pump assembly in 190-KW was completed satisfactorily on April 15. Installation of the other pump sets in 190-KW was proceeding toward the proposed ready-for-use date of August 15, 1954. At 190-KE Building, all service water and backwash pumps were completed, and other installations were proceeding on schedule.

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For the 183-KW Filter Plant, all chemical storage facilities have been installed. The chemical feed systems for alum and chlorine have been completed, and instrumentation is being installed. Testing of the 183.1 KW caustic and sodium dichromate tanks began on April 30, 1954.

Work is progressing satisfactorily on the 1700 Buildings, railroads, retention tanks, substations, and the 230 KV Transmission Line. All concrete walls of Building 1706-K have been placed to elevation minus 13 feet. The overflow drainage system was essentially completed.

105-KW and 105-KE Reactor Facilities

Design remained at about 99% complete. Construction progress was as follows: KW progressed 6.2% to a total of 72%; KE progressed 5.5% to a total of 58%.

Cumulative totals of concrete placed to date were: 105-KW, 24,353 cubic yards; 105-KE, 23,983 cubic yards. The corresponding totals of structural steel placed were: 105-KW, 2711 tons; 105-KE, 2654 tons. At 105-KE, 386 tons of cast iron blocks were placed, bringing the total tonnage of thermal shielding for KE to 737.

The gas leakage test of 105-KW Reactor was conducted satisfactorily, and the loss remained within the allowance of 60 cubic feet per hour. This test was continued during placing of aggregate for the the top shield in order to detect any possible ruptures of the "skin". Installation of the two 36" downcomer overflow pipes was begun at KW. All front face crossheaders have been tied into front face risers. Work was continued on instrumentation, monitoring systems, electrical services, and safety systems.

At 105-KE, cast iron was completed on both right and left sides. Installation of gun barrels, flanges, and boilers was begun on April 28. The leading-in of the side thermal cooling tubes was essentially completed.

Fabrication of process tubes for KE Reactor was begun on April 29. The 59 outlet crossheaders were checked and accepted, and 36 of the inlet crossheaders were drilled. Fabrication of the KE downcomer was about 92% complete.

During fabrication it was discovered that Threadolets contained faults which were not discernible by naked eye or X-ray. Pores in the metal were revealed by grinding and pickling. On April 23 it was decided to machine and etch Threadolets originally ordered for rear faces on 105-KW and KE to provide sufficient acceptable connectors for the front face of KE Reactor. All construction and installation work for KE Reactor is being scheduled to meet the proposed graphite packing date of May 10 to 12.

An inventory of graphite stocks was started April 19 and was essentially completed by the end of the month. A study is underway to determine increasing costs of KW fabrication as a result of cracking of carbon procured under the G-5 contract. This same information will be developed for 105-KE upon completion of packing.

At present, only two items of procurement, vertical rod cylinders and horizontal rod tips, threaten completion of the 100-K Reactors. It was recommended that the order for rod cylinders be placed with a different vendor.

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CA-513-A - Purex Facility

Design was 98.8% complete as compared to scheduled completion of 100%. Construction progressed 6.7% to a total of 36%, which conforms to the revised schedule.

Of the 2537 drawings required from the architect-engineer, 2484 have been received, and 2415 have been approved. All of the 44 specifications have been received and approved. Of the estimated 580 requisitions required from the architect-engineer, 570 have been received, and 551 have been approved to date. All of the required 65 acceptance test procedures have been received, and 40 have been approved to date.

Construction has been accelerated to three full-strength shifts for mechanical phases. Concrete placements consisted of about 7600 cubic yards in the 202-A Building and related structures. The concrete roof slabs were completed, and the built-up roofing was 26% complete. Extensive progress was made on concrete cell cover blocks, diversion box covers, and other miscellaneous placements.

Setting of kickplates has become one of the key factors of this construction project. Of the 565 kickplates required, about 175 have been set, and of that number about 150 have been embedded in concrete.

Erection of structural steel in the service area was 90% complete, since work was suspended almost two weeks to allow sufficient progress of general construction. Welding of piping in the Hot Pipe Trench began on a three-shift basis on April 14. Installation of vessels in the basement of Aqueous Make-Up was started April 23. Vessels TK-104, 106, and 107 have been bolted to the tank pads.

The 272-E Mock-Up Building remained at about 95% complete; however, this building is ready for installation of mock-up equipment as it is received.

The concrete barrel of 291-A Stack was completed during early April, and preparations were made for installation of the stack liner. Work proceeded on excavation, forming, and placement of concrete for the air tunnel.

During testing of the 2901 Export Water Line on April 14, three sections of pipe failed and were damaged so extensively that they were returned to the vendor for repair.

Lump sum contractors proceeded on additions to the 283-E Filter Plant and 284-E Power House. Erection of structural steel and installation of flocculator equipment in 283-E Filter Plant was begun.

The 241-A Tank Farm was about 3% ahead of schedule. All six tank bases have been completed. Two tank bottom plates were completed, and one tank shell was nearing completion.

Good progress was made on diversion boxes, encasements, and all phases of piping.

CA-513-D (ER A-747) - Hot Semiworks Conversion

Design progressed 1% to completion; construction progressed 10% to a total of 38%. Installation of electrical equipment and instruments has started. Piping in the cells

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was about 46% complete. The footings for the demineralizer had been placed.

Design of the self-concentrator was about 75% complete. Revision No. 6 to the project proposal, requesting that the self-concentrator be included in the Hot Semiworks Conversion project, is being reviewed by the A.E.C. Meanwhile, orders have been placed for inner and outer vessel shells of the concentrator. Stainless steel pipe for the waste line to "C" farm was obtained from the plant site.

CA-514 - 300 Area Expansion Program - Production Facilities

Both design and construction were revised downward to 31% complete to indicate a change in scope. The A.E.C. has authorized General Electric Company to incur costs not to exceed $4,135,000, and has established the completion date of March 1, 1955.

The lump sum portion of 313 Building Addition was essentially completed. The rolling doors have been erected, and work was continued on erection of the steel partitions. Data were being obtained for heating and ventilating installations, and the bids for control systems were being analyzed. Two heating and ventilating units have been set in place, and other interior facilities were installed. The settling and cooling tanks were placed in the autoclave pit.

Work at 303-F Building and the Tank Farm consisted of placing concrete, erecting steel for the still house, and installing tanks.

At the existing 313 Building, Minor Construction forces laid the tile, installed lighting equipment, set new Hauserman partitions, and painted the interior as necessary. Preliminary work for other installations continued at a good rate.

Procurement of engineered equipment proceeded into the final phases. The total estimated cost of equipment on order, out for bids, or being reviewed was $1,080,000.

The badge house and parking lot projects were about 80% complete. Communications facilities were about 70% complete, and the general outside facilities remained at about 50% complete.

CG-535 - Redox Capacity Increase, Phase II

Design progressed 8% to a total of 92%; construction progressed 8% to a total of 28%. The architect-engineer portion of design was completed on April 15. A revised one-time report of design and construction progress schedules was submitted.

Construction work on 233-S Building proceeded under SWP conditions. Vessel fabrication was about 70% complete. Plant Forces are fabricating jumpers as rapidly as materials will allow. Of the 142 jumpers required, 53 have been completed.

CA-539 - Additional Waste Storage for Redox

Design had been completed previously; construction progressed 8.3% to a total of 92.3%. Concrete domes on the remaining nine tanks have been placed. Piping in the condenser house was essentially completed. Backfilling, grading, and installation of air condensers

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have been completed on Tanks 101 through 106. Installation of the Crust Breaker in Tank 101 was essentially completed.

CA-546 - Fuel Element Pilot Plant

Design progressed 11% to a total of 90%; construction progressed 12% to a total of 19%. Design of the hoods for the equipment exhaust was started by Design Section during the latter part of April. The A.E.C. issued bid assemblies for Phase II work on April 16, and the bid opening date was set for May 13, 1954.

For the Phase I work, the contractor proceeded on roofing, painting, and installation of the doors. Minor Construction forces covered ducts for underground electric power, and also performed work for installation of steam lines.

CG-550 - Reactivation of P-10 Facilities

Design had been completed previously; construction progressed 1% to a total of 99%. Minor Construction continued assembly of 105-B supply casks, and completion of this phase of the work was scheduled for May, 1954. An inventory, with missing parts indicated, of the parts for the five metal-handling casks has been prepared for the sponsor.

CG-573 - Hanford 3X Program - 300 Area

Design completion status was revised downward to 66% to represent the increase in scope. Construction progressed 3% to a total of 58%. Following approval by the Manufacturing Department, design work proceeded on the new layout for 303-J Building. A revised estimate is being prepared for inclusion in the revised project proposal.

The hydraulic units were set in the south addition. Service installations included power panels, ductwork, and lines for electricity, steam, and water. The thermo-analysis unit and the main lighting service were moved. Erection of structural steel for the water tank, roof opening, and monorails was started.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design progressed 1% to a total of 50%; construction remained at 11% complete. Procurement was 26% complete. A revised Construction Status Chart - One-Time Report of design and construction progress schedule was submitted.

CA-187-D-III - Redox Cooling Water Disposal Basin

Design and construction work to be performed by the lump sum contractor had been completed previously. Construction work to be performed by Minor Construction progressed 17% to a total of 73%. Backfilling of the "S" facility swamp was continued. The moving of the H.M. Chamber from the 207 Basin to the manhole south of the basin was nearing completion.

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CA-434 - New Bio-Assay Laboratory

Design had been completed previously; Phase I construction remained at 99% complete; Phase II construction progressed 5% to a toal of 95%. Progress was delayed by the lack of a few stainless steel fittings which were missing from the recent shipment, and work on the ventilation system was delayed by the lack of a bank of louvers. Work is being scheduled toward use of the facility during the latter part of May, 1954.

CA-441 - Solvent Building

Design was completed. The plans and specifications for bidding are to be transmitted to the A.E.C. during early May, 1954.

CA-489 - Positive Ion Accelerator

Completion status remained at design 100%, construction 99%. With installation of the accelerator completed, the A.E.C. has issued a work order to Minor Construction for removal of the temporary fence.

CG-511 - Completion of Minor Construction Fabricating Shops

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CA-544 - Central Distribution Headquarters

With scoping completed, the project proposal has been prepared and is being routed for required departmental approvals.

CG-545 - Soil Science Laboratory Facilities

Design had been completed previously; construction was completed, although the lack of one aluminum valve has prevented final installation of equipment. A substitute valve was found among spare parts.

CG-549 - Activate Task I, RMA Line - Building 234-5

Design progressed 5% to completion; construction remained at 6% complete. Revision No. 6 to the project proposal, requesting the remaining authorized funds, has received all the required departmental approvals. All the available, approved prints have been issued to Minor Construction, as well as the information pertinent to material procurement.

CG-551 - Expansion of Building 234-5 Facilities

Completion status remained at design 99%, construction 12%. Part B of this project was started April 6, 1954, with moving of equipment and machinery from the 234-5 Building shop to the 272-W Building. This work can probably be completed during May, 1954, thus enabling Minor Construction forces to begin work earlier than planned. Additional men have been assigned to the fabrication work in shops at 200-W and 100-F.

On April 12 a new millwright foreman was assigned to the shop work, and the eventual plan is to use this foreman exclusively on this project.

CA-555 - Graphite Hot Shop and Storage Building

With scoping completed General Electric Company has been directed to proceed with the design of this facility. The location will be determined following a study of existing buildings which is now being made.

CG-556 - X-Level Controlling and Recording Equipment

Design had been completed previously; construction progressed 3% to a total of 18%. This project has been delayed by higher priority work. A revised project proposal and a revised construction schedule are being prepared.

CG-558 - Reactor Plant Modification for Increased Production

An initial construction schedule has been prepared for the total project, primarily to indicate work sequence. Requirements for design and procurement are being evaluated so that an overall schedule may be prepared. Procurement action has been concentrated on horizontal rod components, rod assemblies, step plug bushings, extrusions, and tubing.

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CG-559 - Heat Transfer Laboratory

Design had been completed previously; construction progressed 40% to a total of 65%. One pump has been set and grouted, and the tie-in has been made to the water service. The shortage of "Q"-cleared pipefitters is being overcome by transfer of craftsmen to this project. If the heat exchanger can be delivered in time, the facility can be ready for use by the middle of May, 1954.

CG-562 - Waste Metal Recovery Plant Modifications

Design progressed 10% to completion; construction remained at 76% complete. A revised project proposal is being prepared.

CG-563 - Modification to 314 Building and Installation of Electroplating Pilot Plant

Design progressed 10% to a total of 80%; construction remained at 20% complete. All drawings were scheduled for comment issue by May 1, with the exception of electrical drawings which are scheduled for issue one week later. Construction work is to be resumed in early May, 1954.

CG-564 - Installation of Additional Ball 3X Equipment, 105-C Building

Design had been completed previously; construction progressed 1% to a total of 93%. The interfering tube section was successfully removed from Hole No. 21. Drop tests of the No. 21 3X unit are to be made during the next scheduled outage.

CA-566 - Building for Prototype Physical Constants Test Reactor

Design was about 80% complete. Eight of the 14 required drawings have been reviewed, and the comments have been returned to the Design Section. A work order was issued to Plant Forces for assistance in the investigation of contamination conditions at the proposed building site.

CG-567 - Alum-Activated Silica Facilities for 100-B, D, F, and H

Construction progressed 2% to a total of 78%. Revision No. 2 to the project proposal, requesting an extension of time to August 1, 1954, was transmitted to the A.E.C. on April 14 Fabrication of the 5000-gallon tank trailer progressed satisfactorily. Delivery is expected during the latter part of May, 1954.

CG-569 - Replacement of Catch Tanks 311-ER and 302-BR - 200-E and W

Design had been completed previously, construction progressed to 40% complete. The installation, piping, and backfilling for the 200-W replacement tank have been essentially completed. Excavation for the 200-W tank was begun.

CG-572 - Particle Problem Animal Exposure Equipment

Design progressed 20% to a total of 30%. Design progress consisted of mechanical and electrical work; however, a study is being made to determine utility of existing equipment now in the 3706 Building. A saving of $2000 to $3000 may be realized if the existing equipment is used.

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CG-574 - Hanford 3X Program - P-10 Irradiation

The scope of this work has not yet been established. Until the study is completed, no materials are being ordered.

CG-575 - Hanford 3X Program - P-10 Extraction

The A.E.C. has directed that scoping and preliminary design be based on installing the required facility in 108-B Building instead of the 271-B Building. Scoping and design are responsibility of the Design Section.

CG-576 - General Improvements to Laboratory Area - 300 Area

Design progressed 30% to a total of 40%; construction progressed 21% to a total of 27%. Revision No. 1 to the project proposal was forwarded to the A.E.C. on April 12. Field engineering has been provided detailed electrical design, as well as detailed design on construction of island work tables and location of machine tools for Section 14-A to 22-A. Minor Construction progress consisted of cutting openings for windows, alterations for ventilation, partitions, and drainage trench. Mechanical work is awaiting procurement of piping materials.

CG-578 - Effluent Water Monitoring Improvements 100-B, D, F, DR and H Areas

Procurement was scheduled to begin during June, 1954.

IR-159 - Improved Ventilation Facilities - 201-C

Design had been completed previously; construction progressed 27% to a total of 97%. The equipment and ductwork have been installed, leaving only general clean-up work to be completed.

IR-162 - Fire Protection Buildings, 272-E and W

Detailed design is being prepared by the subcontractor to the construction contractor, and the detailed design has not been submitted for approval.

IR-172 - Laboratory Supply Space, 3706 Building

Both preliminary design and project proposal preparation had been completed. The project proposal is being circulated for approvals.

* * * * * * * * * * *

The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

ER A-742 - Remodeling First Aid Buildings 100-B, D, and F

With preliminary design completed, the Plant Auxiliary Operation Department has requested that this work be continued. The sponsor has also requested determination of a suitable method of providing decontamination showers and first aid stations in 100-H and 200-W Area.

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ER A-1212 - Diversion Outlet from Retention Basins, D and F Areas

Drafting for this request was completed on April 28, 1954, and a cost estimate has been prepared.

ER A-2748 - 221-T Building Roof Repair

The project proposal was about 75% complete. The Design Section has completed a sketch and submitted recommendations for the work to be done. A rough draft of the project proposal is being circulated for comment.

ER A-2749 - Sheltered Welding Manifolds - 200 Areas

The second rough draft of the scope was reviewed and approved by all parties concerned. An estimate is now being prepared.

C. RELATED FUNCTIONS

The work load for field inspectors remained about level during the month. Two additional Supervising Vendor Inspectors were assigned to reduce the heavy work load on Technical Inspectors and to provide maximum coverage of fabrication orders. Fabrication of vessels for Purex was beginning, and it now appears that this work will require constant attention of inspectors.

Procurement of engineered equipment and materials for 100-K appears to be in closer control. The vendor of process water pumps has begun replacement of pump bowls which were found to be cracked during casting. The two remaining items which might delay construction are vertical rod cylinders and horizontal rod tips. These items are being followed closely.

During fabrication of Purex vessels it was found that one heat of the 304-L stainless steel plate had extensive inclusions of foreign material. Some portions of the partially-fabricated Purex vessels may require replacement.

The Corrosion Testing Program now being conducted in a Seattle laboratory dropped about 25% because comparable laboratory services were obtained on the East Coast nearer to the fabrication site. The Seattle laboratory processed 625 samples.

Following is a resume of Inspection and Materials Unit activities during the month:

ITEM	NUMBER
Total orders on hand requiring inspection	1166
Cumulative number of orders assigned to inspectors	1093
Number of orders assigned to inspectors this month	163
New orders received by Inspection during the month	142
Orders completed	74
Total requisitions for engineered equipment transmitted for Expansion Program	85
Total orders of engineered equipment placed for Expansion Program	159

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At the end of April there had been grand totals of 2730 Expansion Program requisitions for engineered equipment transmitted, and 2630 placed.

Reproduction output was 605,434 square feet during the 20 regular working days, including 340 hours overtime. The major orders processed during the month included 16,484 prints for Purex, 3899 prints for 100-K Reactors, 1331 prints for 100-K Water Works, and 1648 prints for CG-558, Reactor Plant Modifications.

Estimating Unit completed 44 estimates during the month. The completed estimates comprised the following: project proposals - 12, comparative - 3, fair cost - 5, high spot - 5, scoping - 14, and miscellaneous - 5.

Field Surveys completed assigned work on the semi-annual inventory of coal piles and checked alignment of pumping equipment in 190-C Building. Survey crews also performed miscellaneous work for the A.E.C., Manufacturing Department, and Engineering Department.

D. CRAFT LABOR

Bus drivers who transport construction workers between North Richland and the work sites have again raised the issue of retroactive isolation pay. This teamster work has been performed on an overtime basis, and the present claim is being based on a technicality in language of the union agreement. The phrasing of the agreement has since been changed to conform with the G.E. isolation pay clause. Potential claims can reach a total of $1,000,000.

On the basis of Ching Panel recommendations, agreement on Schedule "A" wages has been signed with the Carpenters' Union. The issue on isolation pay was resolved by a separate letter in which the contractors agreed to include carpenters in any increase of isolation pay negotiated with the Building Trades Council.

The Building Trades Council has continued its picketing of Cisco Construction Company. During shift change, pickets are withdrawn from their stations at the south entrance of Richland. The A.E.C. ban on picketing in Richland has aroused some additional side-issues.

Percentages of voluntary terminations from the two major construction contractors remained high during the month of April. Kaiser Engineers and associates lost 8.9%; Blaw-Know and associates lost 14%. Voluntary terminations from J. A. Jones Company increased from 0.7% to 1.7%.

There has been a reduction in both number and duration of delays caused by labor troubles in vendors' plants. This condition has not been reflected numerically; it has been noted periodically as a trend which has borne indirectly on construction progress at Hanford.

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REPORT OF VISITORS

To Hanford

None

Official Trips to Other Installations

J. S. McMahon and J. C. Hamilton visited Blaw-Knox Company, Pittsburgh, Pennsylvania, from March 20 through March 31, 1954, to coordinate inspection, purchasing, and expediting functions.

H. P. Shaw visited the following companies from March 31 to April 6, 1954, to consult on engineering and to expedite orders: National Acme, Cleveland, Ohio; Ohio Crankshaft, Cleveland, Ohio; Monarch Machinery Tool Company, Sydney, Ohio; Metalwash Machinery Corporation, Elizabeth, New Jersey; and Leeds and Northrup, Philadelphia, Pennsylvania.

C. P. Lawson visited the following companies from April 2 to April 9, 1954, for coordination of Inspection activities: Matt Corcoran, Louisville, Kentucky; Rempe Company, Chicago, Illinois; Pfaudler, Elyria, Ohio; Steel & Alloy Tank, Newark, New Jersey; Alloy Fabricators, Perth Amboy, New Jersey; Bird Machinery Company, South Walpole, Massachusetts; and Fritz Glitsch & Wyatt, Dallas, Texas.

J. R. Kelly visited Bingham Pump Company, Portland, Oregon, from April 4 to April 5, 1954, to inspect repair of 190-K secondary pumps purchased on Order No. KE-6664.

R. J. Cavanaugh visited the following companies from April 12 through April 19, 1954, to discuss machinery and equipment to be used in the 300 Area Expansion Program: Udylite Corporation, Detroit, Michigan; Ohio Crankshaft Company, Cleveland, Ohio; Metalwash Machinery Corporation, Elizabeth, New Jersey; and National Acme Company, Cleveland, Ohio.

F. M. Stratton visited Panellit Incorporated, Chicago, Illinois and Weston Instrument, Newark, New Jersey, from April 14 to April 28, 1954, to assist in final tests of temperature monitoring equipment and to attend a course in repair, maintenance, and operation of relay meters.

W. B. Webster visited the following locations from April 19 to April 26, 1954, to consult on engineering for Purex and other Separations projects: Knolls Atomic Product Laboratory, Schenectady, New York; Vitro Corporation, New York, New York; and Savannah River Works, Savannah, Georgia.

F. H. Ames visited General Electric Company and Columbia Broadcasting System of New York, New York, from April 18 to April 22, 1954, to discuss color television viewing systems. Also Mr. Ames visited Van Vetter Company, Seattle, Washington, on April 26, 1954, to approve vendor's drawings.

C. P. Fleming visited the following companies from April 29 through May 1, 1954, for coordination of Inspection activities: A. O. Smith Company, Los Angeles, California; Pacific Tube, Los Angeles, California; and Pacific Coast Engineering, San Francisco, California.

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R. G. Colwell visited the following companies from April 19 to April 29, 1954, for coordination of Inspection activities: Electric Boat Company, Groton, Connecticut; Graham Manufacturing Company, Batavia, New York; Fritz Glitsch & Wyatt, Dallas, Texas; and Metal & Carter Craft, Dallas, Texas.

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - APRIL 1954

EMPLOYEE RELATIONS SECTION

The number of applicants interviewed in April was 1,689 as compared with 2,091 for March. In addition, 209 new applicants applied by mail. Open, nonexempt, nontechnical requisitions decreased from 460 at the beginning of the month to 371 at month end. One hundred and one employees were added to the roll and 98 removed during the month. Separations rate increased from .52% for fiscal month of March to .67% for fiscal month of April. These rates when converted to annual basis are 5.42% and 8.74%, respectively. During April 58 new requests for transfer to other type work were received by Employment, and 41 transfers were effected. Attendance recognition awards were distributed to 246 employees in April, including 34 who qualified for four-year awards.

Four employees died during the month and two employees retired. Two hundred and nine visits were made to employees confined to Kadlec Hospital, and 63 checks were delivered to employees confined at the hospital or at home. At month end participation in the Pension Plan was 97.6%, in the Insurance Plan 99%, and the Employees Savings and Stock Bonus Plan 49.1%. At month end there were 757 registered under Selective Service and 763 military reservists were on the roll. Since August 1, 1950, 330 employees have terminated to enter military service, of which 92 have returned, 18 have not claimed re-employment rights, leaving 220 still in military-leave status.

A total of 75 new employees attended orientation meetings. Of this number, 96% have signed up to participate in the Pension Plan, 98.6% in the Insurance Plan, and 88% in the Good Neighbor Fund.

Sixty-four adopted suggestions were approved for awards in April, resulting in cash awards totaling $1,150 with a total net savings of $11,960.32.

Thirty-two applications for GE Scholarships under the Company's Educational Assistance Program were reviewed, summarized, and forwarded to Schenectady for consideration during the month.

Training and Development programs and activities were as follows: Labor Management Relations, Effective Human Relations, Principles and Methods of Supervision, Conference Leading, and Customer Relations.

A plan for publicizing and promoting favorable employee response to establishing a GE Service Recognition Plan for HAPO employees was developed.

PUBLIC RELATIONS SECTION

The News Bureau issued 39 news releases during the month.

An atomic energy display was planned, prepared, and set up at the Central United Protestant Church for some 200 college students from Idaho, Oregon, and Washington, who attended a meeting of the Methodist Youth Movement held here on April 2, 3, and 4.

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Employee and Public Relations Summary

PUBLIC RELATIONS SECTION (Continued)

Two Hanford exhibits were displayed at the annual meetings of the Inland Empire Science Fair and the Inland Empire Educational Association, held in Spokane on April 7, 8, and 9. An estimated 3000 teachers attended the Association meeting, and several thousand persons visited the Science Fair.

The Community Newsletter and copies of the Annual Report, with a message from the General Manager, were sent to community leaders in two separate mailings.

A test TV release film is nearing completion. Narration for the seven minute film is now being written and will be recorded on tape. This first TV release, which contains scenes from previously produced HAPO motion pictures, is "An Atomic Style Show" dealing with the types of protective clothing used in radiation zones on the plant.

Five editions of Hanford SCIENCE FORUM were written, transcribed, and released for broadcast in April on KWIE at 8:00 P.M., on Tuesdays.

The eleventh and last package program of the Public Health radio series, "For Better Living," entitled "Make Way for the Bride," was edited, assembled, and released for broadcast over radio station KPKW on April 1.

For the promotion of National Hospital Week, a fifteen minute radio interview was recorded for release to the three local radio stations during National Hospital Week.

Three hundred and eleven still photography assignments were completed during the month of April, producing a total of 10,587 prints, of which 4,270 were "A" and "B" employee identification badge prints. A total of 5,772 prints were area and news work.

SALARY ADMINISTRATION SECTION

The normal administrative work of the Section, and the continued study of organization structure proceeded according to schedule.

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Review of the evaluation data resulting from evaluations made within departments in accordance with the proposed new evaluation plan resulted in one substantial change and a few minor changes in the plan. The modified factors and corresponding scores now permit the evaluation of positions throughout the entire range of levels. Work continued in reconciling positions within and between departments. This work also contributed to the validation of the position evaluation plan.

The position description form was amended by addition of paragraphs describing the authority and accountability of incumbents of positions. This amended position description form is now adequate for its intended purpose.

The regular quarterly report for the third quarter of FY 1954 was prepared and sent to the Atomic Energy Commission.

A communication relating to the audit of records, which was completed by the Atomic Energy Commission last month, indicated that these records were satisfactory for their intended purpose.

Employee and Public Relations Summary

UNION RELATIONS SECTION

Contract negotiations with the Building Service Employees Union, the Hanford Atomic Metal Trades Council, and the Hanford Guards Union are under way.

Negotiations with the radiation monitoring Inspectors were concluded on April 13.

The Wage Rates Unit participated in wage surveys conducted by the National Lead Company of Ohio, Eastman Kodak Company, Boeing Airplane Company, and Welch Grape Juice Company. A member of the Wage Rates Unit contacted 35 companies in the Pacific coast area collecting survey data of rates paid process operators and the current relationship of these rates to chief operators and craft workers. A plantwide study of the rates paid Technical Graduates was completed.

Mr. Lewis J. Male, of the Wage Administration Services Department, visited HAPO for a series of conferences on wage rate matters and a tour of the plant to view jobs.

TECHNICAL PERSONNEL SECTION

Twenty-five new technical graduates have been hired against an authorization of 40, and additional responses are coming very slowly. The recruitment of Ph.D. candidates, principally in metallurgy, engineering, and physics, to fill our requirements of between fifteen and twenty hires, is proceeding very slowly with three acceptances to date; however, it is expected that the needs in the most critical fields of metallurgy and physics will be met.

The Rotational Training Program still has 41 members, the same as a month ago. Organizational changes have delayed additional placements.

Of 226 paid registrations for the second semester, the School of Nuclear Engineering still has 205 active students. In general, the new subjects offered in the school are meeting the approval of the affiliated colleges as regards recognition for credit.

HEALTH AND SAFETY SECTION

No major injuries were reported in April making the total to date three, as compared to six for the comparable period in 1953. Minor injuries increased from 313 (frequency 2.17) in March to 387 (frequency 2.87) in April. There were three sub-major injuries. There have been 65 days without a lost time injury, and this represents an excess of three million man hours.

Consideration has been given to the proposed legislation for hospital disposal and recommendations made to change undesirable features.

COMMUNITY

On April 15 a bill was presented to Congress for the disposal of federally owned properties at Richland, and studies are being made of the proposed legislation.

As of April 30 there were 267 housing applications pending.

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COMMUNITY (Continued)

The Richland Fire Department has been notified by the Chamber of Commerce that Richland was awarded eighth place in the nation and first place in the State of Washington in its population class in the 1953 National Fire Waste Contest.

Water was turned into the main Richland irrigation canal on April 16, and the irrigation distribution system was placed in operation throughout the community.

ORGANIZATION AND PERSONNEL

Total on Roll April 1, 1954	858
Accessions	29
Separations	22
Total on Roll April 30, 1954	865*

*This includes 41 Rotational Trainees.

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Employee and Public Relations

EMPLOYEE RELATIONS

Employment

	March, 1954	April, 1954
Applicants interviewed	2,091	1,689

686 of the applicants interviewed during April were individuals who applied for employment with the Company for the first time. In addition, 209 applications were received through the mail.

Open Requisitions	March, 1954	April, 1954
Exempt	2	1
Nonexempt	460	371

Of the 460 open, nonexempt, nontechnical requisitions at the beginning of the month, 271 were covered by interim commitments. Of the 371 open, nonexempt, nontechnical requisitions at month end, 190 were covered by interim commitments. During April, 95 new requisitions were received requesting the employment of 114 nonexempt, nontechnical employees.

	March, 1954	April, 1954
Employees added to the rolls	93	101
Employees removed from the rolls	71	98
NET GAIN OR LOSS	+ 22	+ 3

Separation Rate:	Fiscal Month March, 1954		Fiscal Month April, 1954	
	Male	Female	Male	Female
	.22%	1.77%	.39%	1.90%

Over-all Separation Rate:	Fiscal Month March, 1954	Fiscal Month April, 1954
	.52%	.67%

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Employee and Public Relations

EMPLOYEE RELATIONS

During April, 11 employees left voluntarily to accept other employment, 3 left to enter military service, and 6 left to enter business for self.

Transfer Data

Accumulative total of requests for transfer received since 1-1-54	256
Number of requests for transfer received during April	58
Number interviewed in April, including promotional transfers	47
Transfers effected in April, including promotional transfers	44
Transfers effected since 1-1-54 including promotional transfers	193
Transfers effected in April for employees being laid off	1
Number of stenographers transferred out of steno pool in April	3
Transfer requests active at month end	321

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community	Firemen	Total
New Hires	4	65	—		69
Re-engaged	—	—	—		—
Reactivates	—	31	—		31
Transfers	1	—	—		1
TOTAL ADDITIONS	5	96	—		101

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community	Firemen	Total
Actual Terminations	6	47	1		54
Removals from rolls(deactivates)	—	40	—		40
Transfers	4	—	—		4
TOTAL TERMINATIONS	10	87	1		98

GENERAL

	3-1954	4-1954
Photographs taken	151	212
Fingerprint impressions	403	172

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Employee and Public Relations

EMPLOYEE RELATIONS

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	3-1954	4-1954
General Electric cases	323	146
Facility cases	18	33
TOTAL	341	179

INVESTIGATION STATISTICS

	3-1954	4-1954
Cases received during the month	375	154
Cases closed	164	113
Cases found satisfactory for employment	390	169
Cases found unsatisfactory for employment	23	12
Special investigations conducted	7	1
Cases closed before investigation completed	55	50

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	6532
One-year awards made in April for those qualifying in March	63
Total two-year awards to date since January 1, 1950	2191
Two-year awards made in April for those qualifying in March	78
Total three-year awards to date	949
Three-year awards made in April for those qualifying in March	71
Total four-year awards to date	213
Four-year awards made in April for those qualifying in March	34

During April, 20 people whose continuity of service was broken while in an inactive status were so informed by letter.

Supervisory Selection Program - Test batteries were administered to eleven candidates and the test results were interpreted and reported to the subject's evaluators.

Clerical - Thirty-five clerical applicants were tested and the results passed on to the interviewers to aid in selection.

Instrument Trainees - Eleven instrument candidates were tested, seven of which had requested transfers and four were gate applicants.

Personal interviews were held at Washington State College, Pullman, Washington, to recruit stenographers and secretaries; also five high schools in the vicinity of Yakima were visited as well as the Kennewick High School.

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Workmen's Compensation, Liability Insurance and Suggestion System

Suggestion System	March	April	Total Sin 7-15-47
Suggestions Received	224	174	13820
Acknowledgements to Suggesters	286	123	
Suggestions Pending Acknowledgement	33	84	
Suggestions Referred to Depts. for Investigation	286	123	
Suggestions Pending Referral to Departments	33	84	
Investigations completed and Suggestions Closed	88	267	
Suggestions Adopted - No Award	0	2	
Adopted Suggestions Approved by Committee for Award	42	64	
Total Net Cash Savings	$ 7,768.78	$ 11,960.32	
Total Cash Awards	$ 1,040	$ 1,150	
Total Suggestions Out to Investigators	734	576	

An award of $135 was paid to an employee in the Technical Information Unit for her suggestion pertaining to delaying off site documented report mailing until all corrections had been made. This suggestion resulted in material and labor savings.

An employee in the Housing and Maintenance Unit received the second highest award of $100 for his suggestion regarding installation of heat resisting material around sink faucets to protect the linoleum. Labor and material savings resulted through adoption of this suggestion.

An employee in the Stores Unit received $90 for his suggestion to use a pre-numbered linen tag on returnable gas cylinders and reduce time required checking and rechecking both full and empty containers. Savings in labor was realized through adoption of this suggestion.

An award of $90 was also paid to an employee in the Separations Section for his suggestion regarding a revised method of machining glove port rings. Savings was labor.

Life Insurance

Code information which is known only to Home Office Life Underwriters Association has been furnished 68 insurance companies and investigation agencies during the month of April, 1954. This is in accordance with an arrangement with the Underwriters whereby employees on this project might be insured on the same basis as those working elsewhere.

Insurance Statistics

	March, 1954	
Claims reported to Department of Labor and Industries	Long Forms: 53	Short Forms: 339
	April, 1954	
	Long Forms: 56	Short Forms: 449

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Total Since Sept., 1946 - 20,165

PRIVACY ACT MATERIAL REMOVED

Insurance Statistics (Continued)

	March, 1954	April, 1954
Claims reported to Travelers Insurance Company	7	* 12

Total Since September, 1946 - 841

*Of the claims reported to Travelers Insurance Company during the month of April 11 were property damage claims and one was both property damage and bodily injury.

Liability Insurance

Bus Collision, 300 Area - was injured on June 17, 1952 in a bus collision which occurred near the 300 Area. Five suits resulted from the accident. Four of the suits were settled out of court, however, the fifth cause of action, started by went to trial resulting in a judgment of $42,356.50 for the plaintiff. filed a motion for a new trial which was granted unless the plaintiff consented to a reduction of the verdict to $19,500 plus the specials. The plaintiff has since advised that he will not consent to the reduction and a new trial is to be held.

-- In December, 1953 Mr. David E. Williams, Attorney at Law, presented a claim against the on behalf of , a employee. The matter was referred to the Travelers and in March a settlement figure of $10,000 was agreed upon subject to approval of the and the The settlement was agreed to by the but was rejected by the On April 14, 1954, a Summons and Complaint was served upon The total amount alleged is $83,590 plus costs. The Commission has since given approval for referral of the action to the Travelers for defense.

-- While employed by on February 24, 1948, sprained his ankle. He was treated for approximately a month and discharged apparently free of symptoms. In February, 1951 he brought suit against the alleging fraud and negligence on the part of physicians employed by the in failing to advise him of the severity of his injury and in failing to report the injury to the Department of Labor and Industries. The Benton County Superior Court awarded $15,051 based upon negligence rather than fraud. The case was appealed to the State Supreme Court and in September, 1953 the Supreme Court reversed the Superior Court and dismissed the action. The plaintiff petitioned for a rehearing before the Supreme Court which was granted and in April, 1954 the Supreme Court sustained their previous position, 5 to 4. It is unlikely that the plaintiffs will apply for further rehearing so that this probably concludes this case.

PRIVACY ACT MATERIAL REMOVED

PRIVACY ACT MATERIAL REMOVED

EMPLOYEE RELATIONS

Employee Benefits

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	209
Salary checks delivered to employees at Kadlec Hospital	63
Salary checks delivered to employees at home	12

At month end, participation in the Benefit Plans was as follows as compared with last month's participation:

	March	April
Pension Plan	97.5%	97.6%
Insurance Plan	99 %	99%
Employees Savings and Stock Bonus Plan	47.8%	49.1%

Four employees died during April, namely:

Plant Auxiliary Operations	4-18-54
Manufacturing	4-25-54
Employee & Public Relations	4-26-54
Manufacturing	4-27-54

Twelve letters were written concerning deceased employees and their families during April, regarding payment of monies from the Company and answering questions.

Since September 1, 1946, 145 life insurance claims have been paid totaling $ 918,013.

Two employees retired during April, namely:

Fred L. Schofstoll	W-4370-626	Normal Retirement
Achellis L. Morris	W-2160-922	Normal Retirement

During April, 21 letters were written concerning retirement and retired employees providing information of a general or specific nature. To date, 287 employees have retired at Hanford, of which 153 are continuing their residence in this vicinity.

75 new employees attended Orientation Programs given by members of this group during April. Of this number, 96% have signed up to participate in the Pension Plan, 98.6% have signed up to participate in the Insurance Plan, and 88% have signed up to participate in the Good Neighbor Fund.

One Board of Trustees meeting for the Good Neighbor Fund was attended by a member of this group during April. The present percentage of participation in the Fund is 66.4% as of the end of the month.

Thirty-two applications for GE Scholarships under the Company's Educational Assistance Program were reviewed, summarized, and forwarded to Schenectady for consideration during the month.

PRIVACY ACT MATERIAL REMOVED

Employee and Public Relations

EMPLOYEE RELATIONS

Military Reserve and Selective Service

Statistics with respect to employees who are members of the military reserve are as follows:

Number of reservists on the rolls		763
Number of reservists classified in Category A	111	
Number of reservists classified in Category B	70	
Number of reservists classified in Category C	69	
Number of reservists classified in Category D	513	
Number who returned to active duty to date		138
Number who returned to active duty in April		1
Number of reservists for which delays have been requested		45
Number of reservists classified in Category B	3	
Number of reservists classified in Category C	2	
Number of reservists classified in Category D	40	
Delays requested (including renewals)		114
Delays granted		106
Delays pending		0
Delays denied		5
Delay requests recalled		3

The statistics with respect to employees registered under Selective Service are as follows:

Employees registered		757
Employees registered who are veterans		241
Employees registered who are non-veterans		516
Deferments requested to date (including renewals)		1261
Deferments granted		1027
Number of employees for which deferments have been requested		162
Number of employees classified in Category B	0	
Number of employees classified in Category C	1	
Number of employees classified in Category D	161	
Deferments denied and appealed at state levels		12
Deferments denied and appealed at local levels		0
Deferments denied and held pending appeal at national level		2
Deferments denied by local board and not appealed		9
Deferments denied by state board and not appealed		45
Deferments denied at national level (by Gen. Hershey's office)		2
Deferments denied at national level (by President)		5
Deferments requested, employees later reclassified		0
Deferments requested, later withdrawn		0
Deferments pending		37

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Employee and Public Relations

EMPLOYEE RELATIONS

Military terminations since 8-1-50 are as follows:

Reservists recalled		116
Selective Service		209
Women employees enlisted		5
	TOTAL	330

Employees returned from military service:

Reservists		56
Selective Service		36
	TOTAL	92

Known number not claiming reemployment rights 18

Number of employees still in military-leave status 220

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Employee and Public Relations
Employee Relations

TRAINING AND DEVELOPMENT

LABOR MANAGEMENT RELATIONS was presented Tuesday 6 in 300 Area to 14 exempt personnel. This program is a clause-by-clause discussion of the HAMTC and other local agreements with the Company.

EFFECTIVE HUMAN RELATIONS first conferences in a series of three meetings were begun for five groups April 13, 14, 20, 21, and 28, with an attendance of 62 supervisors. These conferences deal primarily with actual human relations case studies. These cases are presented through various films, records, and written background, allowing group discussions of these and other on-the-job cases of the supervisors attending.

PRINCIPLES AND METHODS OF SUPERVISION was held during the two weeks of April 12-23, with 28 supervisors completing the course.

HOBSO II was presented Tuesday 13 and Wednesday 27 for 22 supervisors. This program covers the effects of war-time economy, government controls, and post-war economy.

CONFERENCE LEADING was conducted Tuesday 20 and 27, with an attendance of 16 supervisors. These meetings are directed toward stimulating interest in learning the techniques of leading group discussions.

Much of the month was spent on transcription of J.I.T. and J.M.T. program material which had been recorded during the Training Institute held in March. Tape recordings were also made from the slide films used in the Training Institute J.I.T., J.M.T., and J.R.T. discussions. A training time table and work distribution sheet have been designed by HAPO Training and Development Unit for the presentation of J.I.T. and copies of these have already been printed. Plans are being made to schedule the first J.I.T. group meetings in May.

PMS dinner-meeting was held on the evening of April 6 at the Desert Inn, with 77 members and guests present. Certificates of completion were presented to Groups 63, 64, 65, and 66. The Manager of Engineering Department was the guest speaker.

At the request of the Consultant-Education and Training Services Department, a complete inventory of current training programs being presented at HAPO was sent to New York office. The inventory is to be used in a Company-wide survey of training programs.

At the request of the Consultant-Education and Training Services Department, each member of the Training and Development Unit completed a personal history form and Institute questionnaire for the New York office.

A survey of the new conference room in 200-W Area was made and found to be satisfactory for training programs and needs. The fire house conference room in 200-W has been condemned.

Employee and Public Relations
Employee Relations

All members of Training Unit attended a special Safety Meeting at the Village Theatre on Wednesday, April 14.

The Supervisor of Training met with three members of Industrial Medical Unit Tuesday, April 13 to discuss possible use of an Industrial Medical official for certain training programs. A Medical representative is currently attending "Effective Human Relations" and will conduct in-service discussion with the Training and Development staff.

Considerable work has been done this month on the Supervisor's Safety program in cooperation with Safety Unit, Plant Auxiliary Department. Training representatives are editing the instructor's manual and all pass-out material, preparing visualizers, and scheduling the program for presentation next month.

A member of Training showed the film "A is for Atom" Friday 23 for the Supervisor of Public Information Unit and a Pile Technology Unit Supervisor, Engineering Department.

A Training Representative of this unit presented "Conference Leading" to the class "Effective Presentation" of the Graduate School of Nuclear Engineering on Monday nights, April 12 and 19. The Supervisor of Training was guest speaker Monday night, April 26 for the "Effective Presentation" class of the Graduate School of Nuclear Engineering. The subject was "Visual Aids".

A Training Representative of Training and Development Unit presented HOBSO I Monday night, April 19 for 16 Pleiss-Davis employees.

CUSTOMER RELATIONS was held Wednesday 28 for 50 Purchasing Unit employees of Plant Auxiliary Department.

Supervisor's Handbook Records:

Number issued during April - - -	0
Number returned during April - -	7
On Hand - - - - - - - - - - - - -	176

Of the 176 on hand 61 are not usable because of missing pages, while 3 have to be checked for completeness. The remaining 112 are ready for issuance. During the last week of April, 23 pages of revisions were distributed to all holders of the "Supervisor's Handbook on Employee Relations."

Requests for the month were 7 second-quarter Training program schedule cards and 6 Business English reference sources.

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Employee and Public Relations
Employee Relations

EMPLOYEE COMMUNICATIONS

Engineering Department functions were highlighted in a double-page photo feature in the GE NEWS. It was the third in a series designed to explain activities of HAPO departments, to help promote teamwork within the departments, and to increase overall employee understanding.

New GE NEWS column was introduced titled "Elsewhere in the Company." The column will be devoted to syndicated news briefs to help keep readers informed of newsworthy activities elsewhere in GE, and to help the "feeling of belonging" with the Company.

Unique approach to safety as presented by visiting magician to HAPO was given continuing promotion in GE NEWS to promote employee interest in attending his performances in each of the Areas.

Support to fund raising campaigns of both Cancer Society and Easter Seal Drive was given in GE NEWS through stories and pictures designed to show employees the need for contributions.

Two separate full page features were devoted to the most recent Suggestion award winners.

Three short, human interest features on employees' activities on and off the job were published in the GE NEWS. One described how sub-station operators at HAPO are trained by use of a training board which duplicates in miniature Hanford's high voltage transmission and distribution system. Another featured a GE design illustrator who has won many awards as a water color painter. The other described the musical background of employees who play in Richland's Symphony Orchestra.

HAPO's transfer policy was reviewed in a lead story in the GE NEWS.

At the request of the AEC, a last minute story was included in the GE NEWS on legislation being introduced to Congress on the proposed sale of Richland homes and business facilities.

Clean-Up Week was introduced at HAPO through lead story which traced philosophy of the week in industry. Follow up was placed in GE NEWS showing the activities of Reactor Section employees in their observance of the week.

GE NEWS included announcements on the holding of two plant open houses: the Civil Defense Control Center in the 703 Building on May 28 and Kadlec Hospital Open House on May 11.

Reorganization of the Financial Department was announced in the GE NEWS giving background behind the changes made.

1214289

Employee and Public Relations
Employee Relations

Employees were advised through lead GE NEWS story of the availability of television sets at employee prices following settling of price problems in this area.

The value of knowing how to administer artificial respiration was pointed out to employees through a feature article with pictures to show the demonstrations presently being given throughout the plant at safety meetings.

A news story on the HAPO employee transfer policy was published during the month. It revealed to employees that nearly 2000 transfers were effected at Hanford last year, thus emphasizing that opportunity for advancement does exist to a marked degree with the Company here.

Production of the "Employee Relations Plan for Improving HAPO Employee Attitudes" was produced, along with a Strictly Private letter from the Manager, Employee and Public Relations, to each Department Head.

A survey of bulletin boards throughout the plant has been made and, as a result, recommendations will be made to appropriate people in the areas for the placement of new or replacement of present bulletin boards.

Action was initiated to determine the number of GE diaries, logbooks, and calendars required by all HAPO Departments for 1955.

OPG 08.5 covering printed employee communications was distributed to HAPO management during the month. It outlined Employee Communications Unit's responsibilities with regard to printed employee information materials. Maintaining of a log of all printed employee communications distributed to HAPO employee groups was initiated.

Two Management NEWS Bulletin issues were distributed during the month.

Printed communications material developed in the East and distributed during the month: the GE MONOGRAM for April, two Employee Relations Newsletters, and the 1953 annual report (distributed through Financial Department). A total of 1250 additional copies of the 1953 annual report were received. Four hundred of these were for distribution by Public Relations, and the balance will be distributed starting next month through the information rack service.

Copy and final layouts for four of the five leaflets planned for use in "Operation Four S" were completed, as were rough layouts for three posters. At month's end this "Suggestion Plan--Cost Reduction Program" was postponed until the fall--with the concurrence of Separations Section, which originated the basic idea.

A promotion plan for publicizing and gaining favorable employee response to establishing the GE Service Recognition Plan at Hanford was prepared. Initial publicity developed for release early in May.

1214290

Employee and Public Relations
Employee Relations

At the request of Public Relations, Special Programs accepted the responsibility for coordinating this year's Kadlec Hospital Open House promotion. A promotion plan was developed which called for assistance from all Public Relations Units, Employee Communications, Kadlec Hospital, and the Kadlec Auxiliary. Two of the unique promotions suggested were a tenth anniversary birthday party for children born during the hospital's first year of operation, and a half-hour documentary-type radio program covering a typical patient's stay in the hospital from admission to discharge.

Open House publicity in the GE NEWS and local newspapers was begun at month's end. Special invitations have been printed for mailing to community leaders by Public Relations. American Hospital Association posters, imprinted with local details, were placed in both plant and community.

Safety information included: preparation of two Lifeline columns for the GE NEWS; preparation of the May safety topic, "Danger, Do Not Operate;" preparation of inserts for the Area Injury Reduction Award posters; and preparation of minutes of the Safety Program Committee.

At the request of Public Relations and the Manager—Engineering, the Special Programs-produced booklet, "here's hanford," which was originally prepared for the Board of Directors' visit last fall, was revised and published as a booklet to be handed out to distinguished visitors to Hanford. Two versions of the booklet were issued: one a complete, bound version to be given to individual visitors; the other an unbound version with space provided for the imprinting of tour schedules and names of visitors traveling in groups. (Four pages containing schedule and names were bound into 50 copies for distribution to members of the Stanford Research Institute, which visited Hanford April 29.)

The third in a series of 10 posters was prepared and produced for Radiation Monitoring Sub-Section, Separations Section.

May health bulletin, "Hurry + Worry," was prepared.

Health Activities Committee Meeting was attended by Special Programs writer in an advisory capacity.

One hundred extra copies of the "Principles and Objectives of the Company's Compensation and Organization Plans" were prepared to meet requests for extra copies.

The April issue of "Your Manufacturing Month" was prepared and produced.

A reprint was made of an article on employee communication and, together with a cover letter signed by the Manager, Employee Relations, was distributed to members of the "Managers Information Group."

1214291

Employee and Public Relations
Employee Relations

Four hundred copies of invitations to a special showing of the orientation film, "Here's Hanford," were prepared at the request of Public Relations.

Twenty-one projection engagements were filled during the month with showings to approximately 800 GE employees. Twenty-seven motion picture films were obtained during the month from off-site on a loan or rental basis for use by HAPO organizations.

3600 GE booklets were distributed throughout the public and employee information racks during the month.

One hundred copies each of four Elliott Service employee relations posters, 90 copies each of two GE photo news posters and 100 copies of an AEC-GE security poster were distributed throughout the plant. In addition, all suggestion plan boxes were serviced.

Art work provided to the GE NEWS during the month by the Employee Communications commercial artist included: laying out two full-page photo features, lettering seven signs for use in a news photo, layouts for a proposed GE NEWS message on the Stock Bonus Plan, and miscellaneous photo cropping.

Major portion of the artist's time during April was devoted to materials for a forthcoming Suggestion System--Cost Reduction Program. This work included: rough and comprehensive dummies for four pamphlets, three posters, and four editorial cartoons, plus developing a cartoon character (Mr. Atomsaver) to be used as a symbol in all printed materials utilized in this program.

Layout and final art work was developed for the May health bulletin and safety topic of the month.

Miscellaneous art service included: sign for Public Relations display, layouts for six safety visualizers, lettering of two visualizers for Training, comprehensive color layout for a new 300 Area letterhead, development of a cartoon character for use in a forthcoming Radiation manual, and final art work on a radiation poster for the Separations Section.

Employee and Public Relations

PUBLIC RELATIONS

During the month of April the News Bureau issued 39 news releases. The breakdown by category, distribution and content was as follows:

Subject		Distribution	
Pay & Benefits	7	Local	34
Employment Services	7	Daily	2
Good Will	5	Tri-City HERALD	1
Technology & Research	7	Special	2
Utilities & Public Works	3		
Safety, Fire, Security	2	Content	
Administration & Legal	1		
Education & Library	2	Information	2
Health, Medicine, Sanitation	3	Short Release	29
Plant Services	1	Long Release	8
Organization Changes	1		
Total	39		

One of the special releases mentioned above was sent to the Public Relations Services Division in Schenectady for use in the special promotional campaign mentioned in previous reports. This was the third set of pictures and written material which has been sent.

Five requests for information on atomic energy were answered this month by sending booklets, fact sheets, and other informative material.

A. C. Prendergast, editor of WESTERN INDUSTRY, spent half a day at Hanford during the month. Articles in preparation, possible articles and information about special issues scheduled by WESTERN INDUSTRY were discussed with him.

The Manager, Public Relations attended a GE public relations meeting in New York City on April 22 and 23 and the Atomic Energy Commission Industrial Information Committee meeting in Columbus, Ohio, on April 27 and 28. One of the many significant results of these two meetings was the impression gathered that both G. E. Public Relations people in New York, and AEC Industrial Information people in Washington, D.C. think HAPO's public relations activities are developing in the direction they consider most desirable for the best interests of both organizations.

Articles submitted to trade publications during the month were: "Maintenance of Reactor Auxiliaries and Instruments," by C. B. Wagner, FACTORY MANAGEMENT AND MAINTENANCE: "Operation's Barometer by Difference Analysis," by Fred W. Richardson, MILL AND FACTORY; and "Mechanical Agitators for Heat Treating," by C. E. Frantz, PRODUCT ENGINEERING.

It also was agreed that we will send a pictorial article based on the Radiochemistry Laboratory to ANALYTICAL CHEMISTRY magazine for their new feature, "The Laboratory of the Month," and R. T. Jaske is preparing an article on heat conversion at Hanford for HEATING AND VENTILATING.

Employee and Public Relations

A humorous novel, based on the early days at Hanford and Richland, was returned to the author with a note saying that since it has been written by him as an individual, the Company had no official interest in it and neither approved nor disapproved its publication.

Papers approved this month were: "Mechanical Agitators for Heat Treating," by C. E. Frantz, for publication in PRODUCT ENGINEERING, and for submission in connection with application for Washington State professional engineer's license; "Pulse Column Variables," by F. W. Woodfield, for publication in CHEMICAL ENGINEERING PROGRESS, and for presentation at an AIChE Nuclear Engineering Conference at Ann Arbor, Michigan, the week of June 20, 1954; "Developments Necessary for General Theories of Creep Useful in Stress Analysis," by K. R. Merckx, American Institute of Mining and Metallurgical Engineers at the 1954 Pacific Northwest Metals and Minerals Conference on April 29, 30 and May 1 at Portland, Oregon; "Synchronous Motors and Their Uses," by D. W. McLenegan, Richland Section of AIEE on April 5, 1954; "Geiger-Mueller Counter Tube Age Characteristics," by W. C. Roesch and J. S. Reddie, meeting of American Physical Society of Seattle, Washington on July 7-10; "The Physical and Biological Distribution of Radioisotopes in the Columbia River Below the Hanford Reactors," by R. F. Foster, May 24 meeting of the American Water Works Association in Seattle; "Automatic Titrators: Principles, Embodiments and Utilities," Seventh Annual Analytical Symposium of the American Chemical Society on June 18 and 19 at the University of Minnesota, by W. N. Carson, Jr.; "Objectives in Nuclear Power Plant Design," by W. J. Dowis, AIEE Richland Section, April 19 and Los Angeles Section May 25; and "Hanford and the Atomic Energy Program," by J. S. McMahon, State Convention of Catholic War Veterans on April 25, 1954 in Yakima.

Abstracts approved this month included: "Effect of Various Meteorological Elements on Temperature Profiles Observed in the First 400 Feet Above the Ground Surface at Hanford," by D. E. Jenne; "A Portable Meteorological Mast," by P. W. Nickola; "Some Observations of Turbulent Diffusion During Inversion Conditions," by B. Shorr, all for presentation at the 129th Meeting of the American Meteorological Society at Pullman, June 23-24; and "Laboratory Heavy-Element Separation in Hanford Multi-Curie Cell," by L. F. Miller, and "Fiberglass Air Filters for Hot Laboratories," by J. F. Gifford, both for presentation to the Third Information Meeting on Hot Laboratories, May 26-28 at Upton, New York; and "Radiative Capture of 300-Mev Neutrons in Hydrogen," by John DePangher, American Physical Society at Seattle, July 7-10, 1954.

"The AC Network Analyzer: A Useful Engineering Tool," by D. S. Baker, for presentation at a forthcoming meeting of the Richland Section of AIEE, received full local approval and approval for oral presentation only from Schenectady.

Talks before public groups included: R. T. Jaske, a substitute for the General Manager, who spoke to the Wapato Lions Club, April 12, on the subject of "Atomic Industry and the Columbia Basin;" J. S. McMahon, the state convention of the Catholic War Veterans at Yakima, April 25, on "Hanford and the Atomic Energy Program;" C. R. Bergdahl, Wenatchee Section of AIEE, April 22, on "The Electrical Engineer and the Atomic Energy Program," and he showed the film "A is for Atom;"

Employee and Public Relations

M. L. Mickelson and G. E. Driver, who provided a talk and demonstration of radiation detection instruments for the Richland Kiwanis Club on April 25; and the Manager, Employee and Public Relations, who presented a short, informal talk to the councilors of the Blue Mountain Boy Scout Council on May 2.

Arrangements were completed for the General Manager to address the Kennewick Kiwanis Club on June 1, and the Spokane Kiwanis Club at noon on Thursday, May 20, and the Manager, Public Relations to address a meeting of the Northwest Milk Sanitation Association at Yakima in June on the subject of public and community relations.

An invitation to present a speaker to the Yakima Valley Sportsman's Association was declined for policy reasons. They requested a speaker to talk about the possibility of atomic power eliminating the necessity for building dams for hydroelectric power.

An atomic energy display was planned, prepared and set up at the Central United Protestant Church for some 200 college students from Idaho, Oregon and Washington who attended a Methodist youth rally on April 2, 3 and 4. The exhibit which now is available for use on other occasions, included a photo tour of Hanford, made up of twenty-three photographs and cutlines, and a display of protective clothing. The sound-slide film "Home Town Richland" and a projector, 250 maps of Richland, and 250 copies of ADVENTURES INSIDE THE ATOM also were furnished.

A representative of the Public Relations Services Division in Schenectady and of the MONOGRAM requested and were sent complete sets of the pictures and cutlines included in the picture tour of Hanford display. An illustrated report of the exhibit also was sent to the COMMUNITY RELATIONS NEWS.

A Radiological Sciences Department display which describes radiation protection work at Hanford, and includes a relief map, charts and illustrations, has been scheduled for the Richland Library for one month, beginning the middle of June.

Two Hanford exhibits were displayed at the annual meetings of the Inland Empire Science Fair and the Inland Empire Educational Association, which were held simultaneously in Spokane on April 7, 8 and 9. An educational aids exhibit was conducted by a representative of Public Information, and an atomic energy exhibit by a representative of Radiological Sciences. An estimated 3000 teachers attended the Association meeting, and several thousand persons visited the Science Fair. A large number of educational aids materials were distributed to educators visiting the aids display. Special activities for the atomic energy display included a preview showing for an encampment of 130 Explorer Scouts from Lewiston, Idaho, and filming of the display by KHQ-TV. The film footage was used by the station on its noon news telecast of April 8. In addition to these displays, the film "A is for Atom" was shown to a large audience at the Lewis and Clark auditorium on the evening of April 7, presented by GE's Spokane Office.

The film "A is for Atom" was shown at a meeting of councilors of the Blue Mountain Boy Scout Council at Columbia High on May 2. About 200 adults attended the meeting. The picture tour of Hanford and a display of protective clothing was placed in the lobby of Columbia High during the meeting. Copies of ADVENTURES INSIDE THE ATOM were distributed.

Employee and Public Relations

Arrangements were made for Benton City High School to borrow six "Science Forum" tapes for use in science classes, and a selection of Sheldon-Claire posters was sent to the Superintendent of Kennewick Schools for posting throughout the Kennewick school system.

A proclamation for National Hospital Week was prepared for the signatures of the President of Richland's Community Council and the mayors of Pasco and Kennewick.

The Community Newsletter and copies of the Annual Report, with a message from the General Manager, were sent to community leaders in two separate mailings.

The GE Advertising and Sales Promotion Department asked if a plastic suit could be provided as an exhibit for a talk to be given by the General Manager, Atomic Products Division, to a conference of utility executives to be held in the East in June. Arrangements, including AEC approval, were made for a suit to be made available. The mechanics of operating the suit as an exhibit during a talk were investigated, and complete information was provided in reply to this request.

A group of research people from various firms visited Hanford during the month under the sponsorship of the Stanford Research Institute. The group spent a day listening to lectures by key people from Hanford. In answer to a request from the Public Relations Director of the Institute, informal photographs were taken during the Hanford visit and sent to him for forwarding to McGraw Hill.

Plans are completed for the premier showing of the HAPO Public Relations produced motion picture "Here's Hanford." The event is scheduled for the evening of May 12 in Jason Lee Auditorium and invitations have been sent to all who participated in the film, as well as to all others instrumental in its production.

The first package of the Construction Progress motion picture footage was delivered to the Contractor, Telefilm, Inc. this month. This was a test shipment and part of the more than 27,000 feet of exposed, undeveloped film footage taken on this Project. Six employees of the studio have been "cleared" by the AEC which, because they are technicians, provides us with the advantages of having film developed and workprinted on the same basis as was previously done at the San Francisco studio.

Good results have been noted from a special questionnaire devised to determine the effectiveness of the film "Here's Hanford." Orientation audiences are asked to complete carefully worked out question blanks on subjects contained in the film. The results not only indicate that the film is serving its intended purpose but, also, that it is highly entertaining and informative.

A second print of the film "Here's Hanford" was processed and sent to us by the processing studio in San Francisco. The studio, feeling we were not entirely satisfied with the first print, made up a replacement at their own expense.

Employee and Public Relations

The tempo in the Current Construction Program has materially increased, especially in finishing operations in several phases of the work. This has, in turn, necessitated a wider coverage of subjects in the Construction Progress Motion Picture Project.

The Manager of Public Relations presented the HAPO Public Relations produced motion picture "Here's Hanford" to a group of General Electric Public Relations representatives from various parts of the country who met in New York City this month. The showing made a very favorable impression on these people. Further showings in New York will be conducted with Company personnel before the film is returned. Other HAPO-produced films also were reviewed by representatives of the advertising agency in New York which handles the GE television programs.

Two newsreel cameramen visited Hanford this month. Arrangements were made for filming of a sound-on-film sequence concerning the heat recovery sytem, a sequence involving the use of protective clothing, various scenes concerning regional survey activities of the Radiological Sciences Department, and use of their two 35mm cameras by our own motion picture photographer to record footage for them in the areas of the Plastic Man.

A request was made of Public Relations Section to rough-edit the "Mechanical Canning" footage during the week of April 9, in preparation for the Fuels Technology Sub-Unit meeting at which the 'Hot Press Canning" film was shown.

A test TV release film is nearing completion. Narration for the seven minute film is now being written and will be recorded on tape. This first TV release, which contains scenes from previously produced HAPO motion pictures, will deal with types of protective clothing used in radiation zones on the plant.

The eleventh and last package program of the Public Health radio series, "For Better Living," entitled, "Make Way for the Bride," was edited, assembled and released for broadcast over radio station KPKW at 4:45 p.m., April 1, 1954.

The program director of KPKW has indicated he would like to broadcast another series of this type as soon as the sixteen inch discs, which he expects, are delivered to the station.

Approximately 30,000 feet of film taken in connection with previously produced motion pictures, has been examined and parts suitable for television package programs segregated for use in the immediate future in preparing five and fifteen-minute TV shows.

Fourteen on-the-spot tape recordings were made at Kadlec Hospital for incorporation in a radio documentary to be assembled and released to promote the Kadlec Open House and National Hospital Week. A fifteen minute radio interview also was recorded with representatives of Kadlec, Our Lady Of Lourdes, and Kennewick Hospitals participating as panelists.

Radio programs for use during Child Safety Week, sponsored by Public Health and Welfare Section, included a tape recorded radio program featuring

kindergarten students of Jason Lee Grade School, their teacher and a local, civic-minded housewife; a previously recorded 10-minute interview; and an interview with a local pediatrician.

Five HANFORD SCIENCE FORUM programs were written, produced and released for broadcast this month.

The Richland Lions Club was shown HAPO's new film, "Here's Hanford" at one of their regular semi-monthly meetings. The Supervisor, Employee Benefits, was guest speaker.

Three hundred and eleven still photography assignments were covered during the month of April, producing a total of 10,587 prints of which 4,270 were "A" and "B" employee identification badge prints. A total of 5,772 prints were area and news work.

A total of 7,875 feet of 16mm motion picture film, black and white, was exposed on the 100-K Construction project.

Projection equipment loans during the month were: $3\frac{1}{4}$" x 4" slide projector, ten times; 35mm Goldie projector, two times; 16mm motion picture projector, fourteen times.

See attached Statistical Report for Photography Unit.

1214298

PHOTOGRAPHY UNIT MONTH OF APRIL, 1954	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" B&W Slides	3¼" X 4" Color Slides
EMPLOYEE & PUBLIC RELATIONS DEPARTMENT												
COMMUNITY OPERATIONS												
Recreation				43	14			31				10
Police			269	47	44			105				
Community Engineering					20			11				
COMMUNITY REAL ESTATE												
Commercial Property			12					6				
PUBLIC RELATIONS										3		1
News Bureau		70	13	134	780	39		131				
Audio Visual					23	10		15				
Photography												6
EMPLOYEE RELATIONS												
G.E. News		14	39	21	210			242				
Special Programs					35			23				
Training		24			42		2	41				
Employment	830							166				
TECHNICAL PERSONNEL			10		12			5				
HEALTH & SAFETY												
Industrial Medicine				4				4	44			
Public Health & Welfare				31	2			21				
LEGAL DEPARTMENT					28							
ENGINEERING DEPARTMENT												
DESIGN			90	6	42	67		66			18	5
APPLIED RESEARCH					14	206		55			39	
FUELS TECHNOLOGY			260	45	24	846		193			37	4
METALLURGY			144			265		12	20		16	
SEPARATIONS TECHNOLOGY					6	51		20				
PILE TECHNOLOGY			567		41	166		67			46	

(Continued)

52-117-71

PHOTOGRAPHY UNIT MONTH OF APRIL, 1954	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" B&W Slides	3¼" X 4" Color Slides
ENGINEERING (Cont.)												
PROJECT ENGINEERING					55						1	6
PROCESS ENGINEERING			58			128		2				10
MANUFACTURING DEPARTMENT												
POWER & MAINTENANCE					15	16		14				
METAL PREPARATION					42			21				
PLANT ENGINEERING					4	29		6				
SEPARATIONS					87	105		48				
RADIATION MONITORING					12	16						
REACTOR					12	16		19				
RADIOLOGICAL SCIENCE DEPT.												
BIOLOGY					12			2			2	
BIOPHYSICS			82		10	40		26			14	6
PLANT AUXILIARY OPER. DEPT.				37				46				
REPRODUCTION					6							
SECURITY	1450	1935			4			28				
FIRE & SAFETY					24			8				
A.E.C. SECURITY	55							11				
A.E.C. SAFETY			26		98			66				
A.E.C. OPERATIONS						6					7	
TOTALS	2,335	2,043	1,570	368	1,718	2,006	2	1,511	64	3	180	48

00311211

PHOTOGRAPHY UNIT
MONTH OF APRIL, 1954

12-F-301

	FEBRUARY	MARCH	APRIL
Total Assignments	185	200	311
Total Negatives	798	856	1,511
Total Prints	7,529	10,587	10,042

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

Negotiations with the radiation monitoring Inspectors were concluded on April 13. The Union accepted the Company's proposal for continuation of existing job grades plus a Grade 11 trainee classification and automatic progression from Inspector B to Inspector A. No concessions of any consequence were necessary.

The Lineman steward who was suspended one day without pay for insubordination filed a grievance on the matter and the grievance was discussed at Step II on April 22, 1954. The Step II discussion occurred after meetings had taken place with the Council, international and local union representatives, and the parties involved. The Company did not concede on any of the demands made by the Linemen.

Contract negotiations are under way. It is expected that, for the most part, the Building Service Employees Union will participate with the Hanford Atomic Metal Trades Council in negotiations and will accept those modifications upon which the Council is willing to agree. Separate negotiations with the Hanford Guards Union began on April 27.

Grievance Statistics:

A total of 41 grievances were received and three Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

All Departments

	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit
Received this month	33	4	1	38	3
Received this year	117	12	1	130	12
Step I					
Pending March 31	4	1	0	5	1
Settled this month*	16	0	1	17	2
Settled this year	79	4	1	84	15
Pending April 30	4	1	0	5	1
Step II					
Pending March 31	25	1	0	26	0
Settled this month**	4	0	0	4	1
Settled this year	26	3	0	29	1
Pending April 30	31	5	0	36	0

*Grievances brought to Step II prior to February 1, 1954, but never processed by the Union are, for the purpose of this report, considered settled at Step I.

**Grievances which the Union formally indicated their intention to submit to arbitration but have taken no further action since February 1, 1954, are, for the purpose of this report, considered settled at Step II.

1211502

Employee and Public Relations

UNION RELATIONS

Grievance Statistics (Contd.):

All Departments

	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit
Arbitration					
Pending March 31	0	0	0	0	
Settled this month	0	0	0	0	
Settled this year	0	0	0	0	
Pending April 30**	2	0	0	2	

By Departments

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	12	48	6	38	3	8
- Nonunit	1	5	0	4	0	0
Separations - Unit	10	22	4	15	0	6
- Nonunit	0	2	0	2	1	1
Metal Preparation - Unit	1	17	1	10	0	4
Plant Auxiliary Operations						
Transportation - Unit	2	5	0	2	0	4
Plant Protection - Unit	4	19	1	6	0	5
- Nonunit	1	1	1	1	0	0
Stores - Unit	0	1	0	1	1	1
Electrical Distribution - Unit	2	2	2	2	0	0
Employee and Public Relations						
Community - Unit	5	10	1	4	0	1
Hospital - Unit	1	1	1	1	0	0
- Nonunit	1	1	1	1	0	0
Radiological Sciences - Unit	1	5	1	5	0	0
- Nonunit	0	1	0	1	0	0
Engineering - Nonunit	0	2	0	6	0	0

*Grievances brought to Step II prior to February 1, 1954, but never processed by the Union are, for the purpose of this report, considered settled at Step I.

**Grievances which the Union formally indicated their intention to submit to arbitration but have taken no further action since February 1, 1954, are, for the purpose of this report, considered settled at Step II.

1210303

UNION RELATIONS

Grievance Statistics (Contd.):

By Subjects

	Manufacturing		Plant Aux. Operations		Emp. & Pub. Relations		Radiological Sciences		Engineering	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Unit										
Discrimination	0	0	1	1	1	1	0	0		
Jurisdiction	10	35	2	12	2	5	0	3		
Health-Safety-Sanitation	0	7	0	1	1	2	0	0		
Hours of Work	2	4	0	4	0	0	0	0		
Overtime Rates	3	7	0	0	0	0	0	0		
Holidays	0	1	0	0	0	0	0	0		
Sick Leave	0	3	0	0	0	1	0	0		
Seniority	2	6	0	2	0	0	0	1		
Grievance Procedure	0	1	0	0	0	0	0	0		
Wage Rates	3	9	0	2	1	1	1	1		
Miscellaneous	3	15	1	4	1	1	0	0		
Nonunit										
Health-Safety-Sanitation	0	0	0	0	0	0	0	0	0	1
Overtime Rates	0	3	0	0	0	0	0	0	0	0
Vacation	0	0	0	0	0	0	0	1	0	0
Seniority	0	1	0	0	0	0	0	0	0	0
Continuity of Service	1	1	1	1	1	1	0	0	0	0
Wage Rates	0	1	0	0	0	0	0	0	0	0
Work Assignment	0	1	0	0	0	0	0	0	0	0
Miscellaneous	0	0	0	0	0	0	0	0	0	1

Construction Liaison

The demand for retroactive isolation pay for construction Bus Drivers who perform the man-haul to and from North Richland on an overtime basis has again become an issue in construction. Since this activity is performed on Company time, no isolation pay has ever been paid. The Teamsters are basing their claim on a technicality in the language of the union agreement which has since been changed to conform with the G.E. isolation pay clause. Something approaching a million dollars is in question.

A Schedule "A" has finally been signed with the Carpenters on the basis of Ching Panel recommendations. The matter of an isolation pay increase was handled by a separate letter in which the contractors agreed to pass on to the Carpenters any increase negotiated with the Building Trades Council.

Employee and Public Relations

UNION RELATIONS

Construction Liaison (Contd.)

The Building Trades Council has been picketing the Cisco Construction Company at the Yakima River bridge on George Washington Way. Pickets are withdrawn at shift change. The announced purpose of the picket is to prevent vendor trucks from serving Cisco. As we understand it, AEC Security issued an edict banning picketing in Richland. The propriety of this edict seems questionable but apparently the Building Trades Council is not willing to contest the matter at this time. The Tri-City Herald is questioning the decision in view of the long-standing picketing that has been permitted at their Richland location.

Wage Rates

A request for reimbursement approval to reclassify chief operator jobs in Separations and Reactor operations from Grade 22 to Grade 24 was presented to the Commission. The action was based on the removal of a line of supervision and greatly expanded duties and responsibilities for the chiefs. The untimeliness in the increase is recognized in view of contract negotiations and a demand from the Chemical Workers for re-evaluation of their job grades; however, the action is long overdue and cannot be further delayed if the Company is to do voluntarily what is right.

A member of the Wage Rates Unit contacted 35 companies covering some 55 plants in the Pacific coast area collecting survey data of rates paid process operators and the current relationship of these rates to chief operators and craft workers. This information is calculated to support our position in rejecting demands from the Chemical Workers and Power Operators for a re-evaluation of their job grade (20) to a grade (21) comparable with the manual crafts.

As a result of recently completed negotiations with the Hanford Atomic Metal Trades Council, a reimbursement authorization request was presented to the Atomic Energy Commission for the establishment of the following new classifications: Radiation Monitor - Journeyman, Radiation Monitor, and Radiation Monitor - Trainee.

A plantwide study of the rates paid Technical Graduates and a determination whether they should remain on the old or be transferred to the new program was completed. As a result of this study, 44 graduates remained on the old plan, and 15 were transferred and will be paid in accordance with the provisions of the new plan.

Mr. Lewis J. Male, Manager of the Wage Administration Services Department at the New York Office, visited the Hanford Atomic Products Operation for a series of conferences on wage rate matters and a tour of the plant to view jobs.

The Wage Rates Unit participated in wage surveys conducted by (1) the National Lead Company of Ohio, (2) Eastman Kodak Company, (3) Boeing Airplane Company and (4) Welch Grape Juice Company in Kennewick.

Two hundred sixty-three (263) automatic increases and three (3) merit increases were processed during April. Requisitions for one hundred seventeen (117) prospective employees and additions to the payroll for sixty-six (66) new employees were approved. Review for proper classification, rate, etc., was made for thirty-one (31) reactivations, one hundred seventy-six (176) reclassifications, ninety-two (92) temporary reclassifications, one hundred (100) transfers, and two (2) transfers from the exempt roll.

DECLASSIFIED

Employee and Public Relations

SALARY ADMINISTRATION

1. The normal administrative work of the Section, and the continued study of organization structure proceeded according to schedule. Audits in the field involving conformance with position descriptions and organization structure were curtailed in favor of work described below.

2. The regular quarterly report for the third quarter of FY 1954 was prepared and sent to the A.E.C.

3. A week of conferences with L.L. Ferguson, Consultant, Salary Administration Services, permitted the determination of reconciled salary levels in accordance with the Company salary plan for department manager and section manager positions.

4. Review of the evaluation data resulting from evaluations made within departments in accordance with the proposed new evaluation plan resulted in one substantial change and a few minor changes in the plan. The modified factors and corresponding scores now permit the evaluation of positions throughout the entire range of levels.

5. Work continued in reconciling positions within and between departments. This work also contributed to the validation of the position evaluation plan.

6. As a consequence of discussions with L.L. Ferguson and with Paul E. Mills, the position description form was amended by the addition of paragraphs describing the authority and accountability of incumbents of positions. This amended position description form is now adequate for its intended purpose.

7. A communication relating to the audit of records, which was completed by the A.E.C. last month, indicated that these records were satisfactory for their intended purpose.

1214306

Employee and Public Relations
Technical Personnel Section

TECHNICAL RECRUITING

With twenty-five new technical graduates hired against an authorization of forty, additional responses are coming very slowly. Accordingly, we have conducted a number of follow-up dinners at the following major schools, jointly with Schenectady representatives to encourage acceptances from the men we want, and to get our quota.

Colorado School of Mines
Colorado A & M College
University of Denver
The State College of Washington
University of Idaho
Oregon State College
University of Washington
Stanford University
University of Santa Clara
University of California
University of Nevada
University of Utah
University of Colorado

In a separate report we are listing a substantial number of present Hanford technical personnel who might be affected by Selective Service policy; this report will also outline what can be done recruiting-wise if additional recruiting should be authorized to meet expected losses.

Our search for PhD candidates principally in metallurgy, engineering, and physics, is intended to produce between fifteen and twenty hires divided between additions and replacements. Although this work is proceeding very slowly (only three acceptances to date) we expect to substantially meet the needs in the most critical fields of metallurgy and physics.

Needs for experienced engineers have declined but we are trying to keep in touch with a few active candidates, recognizing that the situation could change quickly. Recruiting visits have been made in California and in Denver at sites where substantial numbers of personnel are being released due to cancellations of other projects. Engineers interviewed at these sites are being considered for actual and potential needs throughout the Atomic Products Division, including KAPL and ANP as well as Hanford.

ROTATIONAL TRAINING PROGRAM

The Rotational Training Program still has forty-one members, the same as a month ago. During April three permanent placements were made and three former technical graduates returned from military service. Organizational changes have delayed additional placements which were contemplated. On the other hand, needs of the ANP Department at Idaho Falls are increasing and can be used as placements for some of our trainees if necessary. Mr. Curtis is helping to reactivate the various college alumni associations to receive the incoming technical and business graduates.

214307

EDUCATION - SCHOOL OF NUCLEAR ENGINEERING

Of two-hundred and twenty-six paid registrations for the second semester the School of Nuclear Engineering still has two-hundred and five active students. The ten percent drop-out to date is a lower percentage than is encountered in most universities. In general, the new subjects offered in the School are meeting the approval of the affiliated colleges as regards recognition for credit.

Programs of graduate-level education in science and engineering are being conducted by an increasing number of universities in and around major cities. We are in touch with the administrators of many of these programs so as to benefit by their experience regarding subjects, sequences, and methods of teaching. Correspondence has recently been opened with the University of Cincinnati, which conducts a broad program for engineers employed in that area, and with the University of Kansas, which has launched a graduate program in Kansas City.

COUNSELING AND INTERNAL TRANSFERS

During April five technical engineers were transferred to other General Electric Divisions, three of these transfers negotiated through this office. In three other cases we have assisted employees in their decisions to remain in their present jobs. Seven others resigned and we were able to help some of these men in locating other jobs.

Considerable effort is being devoted to counseling employees who are seeking transfers due to either geographical or job reasons.

UNIVERSITY RELATIONS

Members of this Section attended the annual regional meeting of the American Society for Engineering Education at Oregon State College and either presented or arranged technical talks before A.I.E.E. Sections in Richland and in Wenatchee.

211388

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
APRIL 1954

General

Personnel Changes
The roll decreased from 268 to 267.

Visits
Dr. Norwood attended the annual meetings of the Industrial Medical Association, also meetings of the General Electric Industrial Physicians and A.E.C. Industrial Physicians. These were held in sequence in Chicago. He then visited the Savannah River Plant for consideration of mutual problems.
Mr. Bakko attended the mid-year meeting of the Washington State Hospital Association in Aberdeen.
The chief pharmacist attended a two-day refresher course in pharmacy in Pullman, Washington.
Dr. Sachs, as chairman of the Mental Health Committee of the State Health Officers Assn., met with Governor Langlie in Olympia to discuss State plans for Mental Health.

Employee Relations
Employee attendance at 23 meetings was 173.

Industrial Medicine
Using frequency of absences rather than total days of absence is proving of greater value in early detection and assistance to the chronic offender.
Medical examinations decreased from 1,050 to 988 while dispensary treatments increased from 4,801 to 5,289.
The health topic was "Stress and Strain".
Sickness absenteeism was 1.66% as compared with 1.73% for March while total absenteeism was 2.43% as compared with 2.41% for March.

Safety and Fire Prevention
No major injuries were reported. The total to date remains at three as compared to six for the comparable period in 1953.
There were three sub-major injuries and 389 minor injuries while the number of all injuries to date is 1,236 as compared to 1,332 for the comparable period last year. Luck would seem to be a factor in our lower major injury rate to date. There have been 65 days without a lost time injury and this represents an excess of three million man-hours and should qualify H.A.P.O. for its sixth "Award of Honor" from the National Safety Council.
Mr. C. R. Powell mixed magic and Safety in attracting 5,500 of our employees to 19 very instructive safety meetings. Steps were taken to increase the stock of safety shoes.

Kadlec Hospital
Consideration has been given to the proposed legislation for hospital disposal and recommendation made to change undesirable features.
Budgetary requests for appropriations to make hospital additions and changes considered advisable before Hospital Disposal were not approved by the A.E.C. locally.
The average daily census increased from 78.0 to 89.2 as compared to 101.7 a year ago.
The occupancy percentage of the mixed services was 87.0. Nursing hours per patient day were 3.18 on the mixed services.

1214309

General (Continued)

Public Health

The measles epidemic is nearing an end with 1,260 cases reported to date. Social Service Counselors had 138 interviews with parents concerning problems with their children. Help in solving marital problems was sought in 72 instances. Burning operations by the mosquito crew were completed with a total of 219 acres of land and 28,000 lineal feet of ditch burned.

Costs-March

	February	March	March Budget
Industrial Medicine (Oper.)	$40,421	$45,471	$42,249
Public Health (Oper.)	9,241	10,999	10,564
Kadlec Hospital (Net)	18,088	20,691	12,302
Hospital Expense Credits	1,519	2,712	2,500
	0	*12,392	17,367
Sub-total-Medical Department (Oper.)	$69,269	$92,265	$84,982
Construction Medical (Industrial and Public Health)	1,074	1,244	1,660
Total-Operations & Construction	$70,343	$93,509	$86,742

*Safety and Fire Prevention just transferred to the Medical and Safety Unit.

The net cost of operating the Health & Safety Section before charges were assessed to various departments was $93,509, about $23,000 more than February and some $7,000 above the budget. Some of the increase was due to assuming the cost of the Safety and Fire Prevention Program. The remaining difference was largely due to the increased salary costs due to three additional days in March. While net costs for the first nine months are $19,000 or 3% less than the budget figure so it seems reasonable to assume that the total section costs will not exceed the budget. However, it seems probable that Kadlec Hospital will overrun the budget by about $15,000 due to revenue being less than estimated.

214316

HEALTH & SAFETY SECTION

APRIL 1954

Industrial Medical Services

The total number of examinations decreased from 1,050 to 988. Dispensary visits increased from 4,801 to 5,289. Minor injuries increased from 313 to 387. General Electric employees sustained three sub-major injuries but no majors. Contractor employees sustained no majors and no sub-majors. Industrial nurses on the active roll were 24.

One information meeting for industrial physicians was held during the month. One vacancy remains on the industrial physicians staff.

Mr. Miller is now being used half time in supervisory training activities for orientation on the personal factors involved in repeated accidents.

First quarter 1954 absenteeism figures were completed during the month based on frequency of absences rather than total days lost and is proving to be a sensitive index for the chronically absent employee. For male employees, one employee was absent eight times during the quarter, seven were absent seven times, seven were absent six times, 35 were absent five times, 90 were absent four times and 226 were absent three times during the quarter. Of the female employees, three were absent eight times, two were absent seven times, ten were absent six times, 39 were absent five times and 65 were absent four times. Employees with the highest frequency rates are now immediately identifiable for investigation and potential corrective action.

A lawsuit was filed in Superior Court of the State of Washington on April 13 against General Electric and the Head of Industrial Medical Services claiming damages in the sum of $83,590 for not informing an employee of questionably abnormal findings on a chest x-ray made during routine medical examination on April 20, 1949 and August 8, 1950.

The Health Activities Committee met on April 15 and the topic on "Stress and Strain" was presented. The subject deals with methods of combating daily stresses and strains in living. Material on this subject was prepared for distribution throughout the plant. The sickness absenteeism was 1.66% as compared to 1.73% for March.

Net costs incurred during March totalled $36,274, an increase of nearly $3,000 or 9% from the previous month. The increase in salaries was the principal contributing factor and was attributable to there being three additional days in March. Also included in March costs were moving expenses incurred through bringing one industrial physician to Richland. Services rendered to the Atomic Energy Commission during the month were approximately $2,000 greater than in February, thereby offsetting partially the increases in gross costs.

219311

Industrial Medical Services (Continued)

Costs Operations

	March	February	Increase (Decrease)
Salaries	$32,963	$29,596	$3,367
Continuity of Service	3,296	2,960	336
Laundry	256	268	(12)
Utilities, Transportation, Maintenance	4,098	3,419	679
Supplies and Other	6,168	5,138	1,030
Total Gross Costs	46,781	41,381	5,400
Less: Revenue	1,310	960	350
Expense Credits	9,197	7,144	2,053
Net Cost of Operation	$36,274	$33,277	$2,997

At the end of nine months' operation, net costs are $25,400 less than the budget. Although gross costs are slightly over the budget ($8,400), charges to other departments for services rendered have been approximately $32,000 or 81% greater.

12:4312

Industrial Medical Services(Continued)	March	April	Year to Date
Physical Examinations			
Operations			
Pre-employment	73	65	252
Rehire	24	22	93
Annual	442	306	1509
Interim	14	157	192
A.E.C.	33	28	119
Re-examination and recheck	229	183	806
Termination	65	98	267
Sub-total	880	859	3238
Contractors			
Annual	13	0	44
Pre-employment	93	74	251
Recheck	41	37	119
Termination and Transfer	23	18	69
Sub-total	170	129	483
Total Physical Examinations	1050	988	3721
Laboratory Examinations			
Clinical Laboratory			
Government	136	103	512
Pre-employment,Termination,Transfer	1527	1457	5149
Annual	2407	1666	8178
Recheck (Area)	109	791	1068
First Aid	23	19	61
Clinic	473	488	1659
Hospital	4481	5225	18867
Total	9156	9749	35494
X-Ray			
Government	19	14	66
Pre-employment,Termination,Transfer	292	151	749
Annual	502	492	1860
First Aid	118	100	392
Clinic	232	199	833
Hospital	308	362	1281
Public Health	4	7	40
Total	1475	1325	5221
Electrocardiographs			
Industrial	70	59	306
Clinic	0	1	3
Hospital	25	40	152
Total	95	100	461

HEALTH & SAFETY SECTION

APRIL 1954

Industrial Medical Services (Continued)	March	April	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	342	434	1403
Occupational Case Retreatments	1304	1594	5090
Non-occupational Treatments	2795	2802	10894
Sub-total	4441	4830	17387
Construction			
New Occupational Cases	71	94	239
Occupational Case Retreatments	181	239	565
Non-occupational Treatments	62	94	203
Sub-total	314	427	1007
Facility Operators	46	32	149
Total First Aid Treatments	4801	5289	18543
Major Injuries			
General Electric	0	0	3
Contractors	0	0	0
Total	0	0	3
Sub-Major Injuries			
General Electric	3	3	9
Contractors	0	0	1
Total	3	3	10
Absenteeism Investigation			
Calls Made	5	7	27
Employee Personal Illness	3	3	19
No. Absent due to illness in family	1	0	1
No. Not at home when call was made	1	4	7

121314

Kadlec Hospital

The average daily adult census increased from 78.0 to 89.2, as compared to 101.7 a year ago. This represents an occupancy percentage of 81.8, broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 87.0; Obstetrical Service 60.0. The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	53	99
Obstetrical Service	4	19
Total Adult	65	116

The average daily newborn census increased from 11.6 to 12.0, as compared to 15.0 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.18
Obstetrical	4.84
Newborn	3.01

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of March was 2.15. When newborn infants are included, the ratio is 1.87.

The net expense for the operation of Kadlec Hospital for March was $20,691, as compared to $18,088 for February. Summary is as follows:

Kadlec Hospital net expense	$20,691
This is an increase of approximately $2,600 due primarily to the higher salary costs of a longer month. Gross costs increased about $6,200, but revenue also increased $2,400 and expense credits, $1,200.	

The following is a summary of employee relations meetings held in the Health and Safety Section during April:

Unit	Number of Meetings	Number in Attendance
Hospital	11	82
Industrial	4	18
Public Health	5	51
Safety & Fire Prevention	1	12
General	2	10
	23	173

1214315

Hospital Unit (Continued)	March	April	Year to Date
Kadlec Hospital			
Average Daily Adult Census	78.0	89.2	83.6
Medical	18.3	21.3	23.2
Surgical	35.8	42.5	35.8
Pediatrics	12.2	12.8	13.1
Mixed	66.3	76.6	72.1
Obstetrical	11.7	12.6	11.5
Average Daily Newborn Census	11.6	12.0	11.5
Maximum Daily Census:			
Mixed Services	83	99	99
Obstetrical	17	19	19
Total Adult Census	98	116	116
Minimum Daily Census:			
Mixed Services	47	53	44
Obstetrical Service	5	4	4
Total Adult Census	59	65	55
Admissions: Adults	572	674	2328
Discharges: Adults	572	669	2306
Medical	155	156	613
Surgical	254	321	1007
Pediatrics	76	100	354
Mixed	485	577	1974
Obstetrical	87	92	332
Newborn	76	85	301
Patient Days: Adult	2418	2677	10,029
Medical	568	640	2788
Surgical	1110	1275	4299
Pediatrics	377	384	1567
Mixed	2055	2299	8654
Obstetrical	363	378	1375
Newborn	360	359	1376
Average Length of Stay: Adults	4.4	4.0	4.3
Medical	3.7	4.1	4.5
Surgical	4.4	4.0	4.3
Pediatrics	5.0	3.8	4.4
Mixed	4.2	4.0	4.3
Obstetrical	4.2	4.1	4.1
Newborn	4.7	4.2	4.6
Occupancy Percentage: Adults	71.6	81.8	76.7
Medical	49.5	57.6	62.7
Surgical	111.9	132.8	111.9
Pediatrics	64.2	67.4	68.9
Mixed	75.3	87.0	81.9
Obstetrical	55.7	60.0	54.8
Newborn	44.7	46.2	44.2

(Occupancy Percentage based on 109 adult beds and 26 bassinets.)

214516

Hospital Unit (Continued)	March	April	Year to Date
Kadlec Hospital (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.78	3.18	
Obstetrics	4.92	4.84	
Newborn	3.10	3.01	
Avg. No. Employees per Patient (excluding newborn)	2.15		
Operations: Major	89	105	354
Minor	99	125	410
E.E.N.T.	79	98	293
Dental	4	1	10
Births: Live	82	77	294
Still	0	2	4
Deaths	6	4	21
Hospital Net Death Rate	.30%	.40%	.42%
Net Autopsy Rate	50.0	75.0	57.1
Discharged against advice	1	1	4
One Day Cases	150	207	617
Admission Sources:			
Richland	75.5	72.7	73.7
North Richland	10.8	12.9	12.7
Other	13.7	14.4	13.6
Admissions by Employment:			
General Electric	69.8	68.7	69.5
Government	3.5	3.6	3.2
Facility	6.4	3.2	4.4
Contractors	16.1	18.2	17.9
Schools	.9	2.1	1.1
Others	3.3	4.2	4.0
Hospital Outpatients Treated-F.A.	603	608	2217
Recovery Bed Patients-F.A.	26	0	70
Physical Therapy Treatments			
Clinic	383	354	1380
Hospital	116	122	438
Industrial: Plant	219	184	752
Total	718	660	2570
Pharmacy			
No. of Prescriptions Filled	2538	2834	10,319
No. of Store Orders Filled	577	546	2,070

1214317

HEALTH & SAFETY SECTION

APRIL 1954

Hospital Unit (Continued)	March	April	Year to Date
Kadlec Hospital (Continued)			
Patient Meals			
Regulars	3787	4207	15353
Children under 8	586	379	1726
Specials	948	1065	4910
Softs	882	1158	3979
Tonsils	129	185	571
Liquids	227	220	793
Surgical Liquids	87	89	331
Total	6646	7303	27663
Cafeteria Meals			
Noon	2003	1804	7579
Night	291	320	1204
Total	2294	2124	8783

214318

HEALTH & SAFETY SECTION

APRIL 1954

Public Health Unit

A further decline in the incidence of communicable diseases reported was noted, due chiefly to the lower incidence of measles in the community. We have reached the point where there are fewer susceptible individuals in the community and therefore the epidemic will be ending. Total number of cases to date is 1260. Other diseases reported of significance are whooping cough and chickenpox. In the former instance, immunizations are being stressed in an attempt to stop the spread of this disease which can be prevented by immunization.

The Public Health nursing home visit level remained about the same with emphasis being shifted to infant care rather than communicable disease. Morbidity and child hygiene visits remained at about the same level.

A Crippled Children's and Handicapped Children's Clinic was held with Dr. C. Don Platner in attendance. Mr. Dan Prosser, Mental Health Consultant of the Washington State Department of Health was also present. Mr. Jack Wright of the Bureau of Community Development of the University of Washington was here to discuss the attitude in community surveys.

A visit was made by the Health Officer to Governor Arthur B. Langlie's office as chairman of the Mental Health Committee of the State Health Officer's Association, to discuss State plans and mental health.

During April, the Social Service counselors had 138 interviews with parents who were concerned about their relationships with their children. Help in solving marital problems was sought in 72 instances.

There were 60 interviews in which children under 13 were helped with behavior and attitude problems and 54 in which similar material was discussed with adolescents. Thirty interviews were held with adults concerned with individual adjustment problems.

Thirteen families were assisted with health and economic problems.

Twenty sanitary inspections were made in food handling establishments. All were found to be operating satisfactorily. Flies are beginning to become prevalent in a few restaurants, due to improper handling of garbage.

Inspection of 34 dairy farms resulted in two being degraded because of continued insanitary practices. Bacteriological results of pasteurized milk and cream samples were well within state standards. Samples of milk from bulk dispensers in restaurants were tested and proved satisfactory.

Sterilization of water mains in new transportation terminal was supervised by this section. Bacteriological samples proved negative for coliform bacteria.

Coliform counts of effluent from sewage disposal plant continued to be higher than desired. However, additional samples were obtained of effluent before it enters Yakima River, and these were well within State standards. They were also less than counts obtained from the Yakima River.

Eight dog bites were investigated for possible rabies. All proved to be negative.

Six nuisances were abated involving dogs and other animals.

12 1 3 19

Public Health Unit (Continued)

Burning operations by mosquito control crew were completed with a total of 219 acres of land and 28,400 lineal feet of ditch burned. Control measures are being discontinued until mosquito larvae are found.

1214320

HEALTH & SAFETY SECTION

APRIL 1954

Public Health (Continued)	March	April	Year to Date
Education			
Pamphlets distributed	12,987	21,109	54,166
News Releases	14	28	59
Staff Meetings	2	2	6
Classes	39	20	87
Attendance	846	707	2,872
Lectures and Talks	11	10	33
Attendance	474	359	1,835
Films Shown	6	27	53
Attendance	209	1279	2,077
Community Conferences & Meetings	16	37	122
Radio Broadcasts	12	9	41
Immunizations			
Diphtheria	1	2	10
Diphtheria Booster	1	8	11
Tetanus	1	2	11
Tetanus Booster	1	8	10
Pertussis	1	2	9
Pertussis Booster	1	8	10
Smallpox	5	7	19
Smallpox Revaccination	1	292	377
Tuberculin Test	0	3	8
Immune Globulin	267	123	654
Other	4	0	4
Social Service			
Cases carried over	94	94	359
Cases admitted	18	15	74
Cases closed	18	17	68
Remaining case load	94	92	365
Activities:			
Home Visits	9	7	30
Office Interviews	341	361	1246
Conferences	39	59	215
Meetings	9	8	31
Sanitation			
Inspections made	153	146	545
Conferences held	15	24	77
Bacteriological Laboratory			
Treated Water Samples	206	196	746
Milk Samples (Inc. cream & ice cream)	39	54	169
Other bacteriological tests	534	697	2476
Total	779	947	3391

1214321

HEALTH & SAFETY SECTION

APRIL 1954

Public Health (Continued)	March	April	Year to Date
Communicable Diseases			
Chickenpox	45	45	163
German Measles	7	7	28
Impetigo	2	0	3
Influenza (U.R.I.)	0	1	2
Infectious Mononucleosis	0	1	1
Infectious Hepatitis	0	3	3
Measles	443	175	1,260
Mumps	2	4	13
Pinkeye	2	0	2
Ringworm	2	0	6
Roseola	2	0	3
Scabies	0	0	1
Scarlet Fever	5	5	48
Streptococcal Infections-Throat	0	0	3
Tuberculosis	0	0	1
Whooping Cough	8	11	21
Total	518	252	1,558
Total No. Nursing Field Visits	687	665	3,055
Total No. Nursing Office Visits	123	161	496

1214322

COMMUNITY OPERATIONS SECTION

ORGANIZATION & PERSONNEL

APRIL 1954

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Non-Exempt	Exempt	Non-Exempt
ADMINISTRATION	1	1	1	1
ELECTRICAL	5	16	5	16
PUBLIC WORKS	10	54	10	59
RECREATION & CIVIC AFFAIRS	3	2 1/2	3	2 1/2
LIBRARY	3	8	4	8
POLICE	17	32	17	32
FIRE	68	0	67	0
ENGINEERING	6	3	6	3
	113	116 1/2	113	121 1/2

1214323

COMMUNITY OPERATIONS SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
APRIL 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	5	16
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
Total End of Month	5	16

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	11
Anchors set and guys installed	0
Street lights repaired and steel mast arms installed	1
Street lights relamped - Mercury Vapor	8
Street lights relamped - 6000L and 4000L, 1100 Area	140
Street lights relamped - 6000L and 4000L, 700 Area	16
Flood lights relamped, 1100 Area	2
Flood lights relamped, 700 Area	0
Stack lights relamped, 700 Area	0
Primary line footage added	0
Primary line footage removed	0
Transformer KVA added	0
Transformer KVA removed	280
Net transformer KVA installed	0
New services installed - residential	0
New services installed - commercial (television amplifiers)	15
Temporary services installed and removed	1
Scheduled outages - primary	0
Scheduled outages - secondary	0
Unscheduled outages - primary	0
Unscheduled outages - secondary	2
Standby and escort	0
High voltage tree trimming	13
Low voltage tree trimming	32

TRAFFIC SIGNALS

Relamping	164
Operational failures	2
Installations	0
Removals	0
Routine maintenance checks	21
Routine check R. R. signal at Van Giesen	4

1211324

COMMENTS

Disconnected 18 prefabs in various parts of Richland, which are to be removed and sold.

Disconnected and reconnected 8 customers for nonpayment of deposits and bills, all of which were residential except for one commercial.

Disconnected service to Morning Sun Dairy building - lease cancellation.

Connected service to 15 television amplifiers mounted on poles at various locations.

Installed metering to Community House, flood lights to Densow's Drug, Parcell parking areas, Transportation Dispatchers shack on Cullum south of Lee, Sewage lift pump at Riverside Park, restroom at Riverside Park, flood lighting at Horse shoe court and band stand at Riverside Park, field house at Columbia Playfield, bridge lighting at Yakima River at GW Way, Burlin Camp, Sewage Lift at Central Fire Station, and main Sewage Plant on GW Way at Abbot.

3000 Area Salvage Yard rearrangements consisted in removing two fenced 480 volt transformer stations and one pole located station, which were in bad condition and subject to increasing excessive maintenance, and serving an area where no further power at that voltage was contemplated. There will be further rearrangements of that nature as operational changes warrant.

Temporary 480 volt power was provided to serve De Walt saw to be used in renovation of warehouse 15-14 and 15.

Replaced three rotted poles on Ogden Street between Willard and Wright. Resagged secondary and fire alarm circuits in Ranch House areas in 8 locations to provide operating and safety clearances between circuits.

Replaced 8 rotted street light poles on Swift between Stevens Drive and Sanford Street. Poles were relocated to provide better lighting. Installed two additional 6000 L lights.

Made fire alarm cutover from open wire to existing cable on GW Way between Williams and Swift Boulevard to eliminate unnecessary circuit. Open wire was removed.

Completed installation of 1000 ft. of 26 pr. cable and removal of 1500 ft. of assorted cable in the vicinity of Duportail and Sanford, as requested by Work Order C-58596 from Telephone Section.

Checked and overhauled main station feeder breakers as follows: BBlSl - 13-14-23-22 and 21.

Serviced and painted three 100 Kva transformers at shop for future use, and one 50 Kva for excessing.

De-energized service to Well C at North Richland field to replace defective 50 Kva transformer, and raised service wires to well where installed at too low height to permit safe vehicular passage.

Completed two Chlorinator control unit installations in North Richland well field.

RICHLAND ELECTRICAL UNIT

Replaced 425 ft. of underground reservoir signal circuit that went bad after contractor left job between Bypass Highway and Yakima River enroute to new storage reservoir. Water supervision was apprised of the defective condition found.

Completed installation of five fluorescent light fixtures in Sewer Plant Laboratory.

Made six temporary fire alarm disconnects and reconnects for contractors engaged in fire alarm additions at various Richland schools.

Revised all Richland pole data, and electrical distribution maps, placing them up to date.

Repaired underground street light wires damaged by fence installation at 1945 Harris.

CALL OUT: Broken primary jumper to Well E at North Richland well field. Foreman and three men from 8:30 to 10:30 A.M. on 4-11-54.

UNSCHEDULED OUTAGE:

Meter at N & H Service Station burned out because of unbalanced load inside building. Housing service electricians were contacted to arrange balanced load in building, and repairs were effected on that basis.

Transformer #1549 in rear of 1525 Mahan blew a fuse at 3:15 P.M. - was back in service by 4:05 P.M. No apparent cause.

UNUSUAL INCIDENT:

Transportation truck hauling for Stores backed into power pole west side of Central Stores, pushing pole out of line and breaking cross arm off pole, but fortunately did not break 7200 volt wire. A potential damage of $1000 was submitted to Mr. Mitchell of Transportation, as fault rested with the actions of two men on the truck. A back charge work order was initiated to cover the repair cost.

RICHLAND ELECTRICAL UNIT

Total signals in operation - automatic	17
Total signals in operation - manual	3
Total signals in operation - flasher	1

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	2
Electrical motors checked and serviced - water	26
Electrical motors checked and serviced - sewage	56

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	4
Outside circuit checks	5
Inside faults repaired	0
Outside faults repaired	1
New circuits placed in operation	0
New boxes placed in operation	0

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	5
Main feeder and tie breaker checks - BB1S2	0
Secondary and pad located stations - Checked jumpers, cutouts, grounds and general condition	0

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Radio interference checks	2
Voltage and load checks	2
Meters tested - customers' requests	6
New meters shop tested	13
Faulty meters replaced	4
Damaged meters and covers	3
Residential read-ins	200
Residential read-outs	161
Residential disconnects - (houses to be sold)	17
Residential reconnects	0
Meters resealed	1
Meters changed out due to excessive load (residential)	3

Note: Consumption and revenue reports, under IBM operation, are not available until 18th of following month.

Consumption and revenue:

	No. of Meters	KWH	Revenue
Schedule 1 - Residential	7045	8,400,000	$ 80,000.00
Schedule 2 - Commercial	342		
Class 1 - (In Lease)		533,450	5,036.61
Class 2 - (Metered Basis)		866,442	9,882.78
Class 3 - (Plant Adm.)		1,289,235	9,121.46
	Total	11,089,127	$104,040.85

1214327

COMMUNITY OPERATIONS SECTION
PUBLIC WORKS UNIT
MONTHLY REPORT
APRIL 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	10	54
Transfers Out	--	0
Transfers In	--	1
New Employees	--	4
Terminations	--	0
Total End of Month	10	59

SANITATION

A total of 1349 tons of garbage and trash was collected and disposed of during April.

ROADS AND STREETS

Patching of street surfacing was intensified this month and 170 tons of pre-mix were utilized in this work.

Drainage and surfacing problems were corrected by reshaping and laying of asphaltic mats at intersections of Gillespie and Cullum; Caples and Goethals; and Swift and Long.

A catch basin and trap connected to sanitary sewer was installed at Benham and Armstead to eliminate water ponding at this location.

Approximately 3000 cubic yards of 3/4" minus and 400 cubic yards of 1/2" chips have been crushed and stock-piled south of the By-Pass.

Preparatory work in connection with the 1954 Seal Coat program is in process and application of seal-coat will be in late May and June.

Routine seasonal repair and maintenance of streets, street signs, drainage systems, municipal sidewalks and parking lots was continued.

PARKS AND PUBLIC GROUNDS

Spraying of approximately 465 acres of open areas with amine formulation of 2-4-D for pollen and weed control was commenced during the first week of April, and 90% of the area had been covered at end of the month.

1214328

Program painting of all park furniture and buildings, and bleachers at Memorial Soft Ball Field was completed during April, and the furniture has been distributed to assigned locations.

Distribution of hoses and sprinklers to parks, public grounds and Real Estate property for use during the 1954 irrigation season has been completed.

Irrigation and mowing of lawn grass was started during the latter part of April.

Approximately 30 plants of privet hedge were placed at the Community House.

Grading and rilling of shelterbelts, in preparation for irrigation, was completed.

Routine maintenance of all park properties, shelterbelts and public areas was continued as necessary.

DOMESTIC WATER

A second pumping test was made at the Richland well field during the first two weeks of April to determine the effects, if any, of the McNary Pool on the underground water storage at this field. Wells 2, 4, 5, 12, 13, and 14, were pumped over the two week period without benefit of surface recharging, and it was necessary to progressively cut back the pumping rate due to continuous draw down of the water table. The amount of draw down verified the results of a previous test that there is no indication of replenishment of this underground storage from McNary Pool.

Wells 3000 - E, F, H, J, K, and L, were again surged and test pumped. To date these wells have developed to only 50% of installed pump capacity.

The automatic roto converters for control of chlorine feed to the 3000 area well headers were installed on April 15. Adjustment and minor alterations were made by the manufacturer's agent and the converters are now in service.

Installation of water mains to service the Combined Transportation Shops has been completed, and the lines have been chlorinated and flushed.

Recharge water was turned into the Richland well field on April 19.

Routine operation and maintenance was continued.

1214329

DOMESTIC WATER

	Well Production Million Gallons	Average Daily Production	Total Consumption Million Gallons	Av. Daily Consump.
Richland	112.5100	3.7503	308.4903	10.2830
North Richland	229.1700	7.6390	55.1122	1.8371
Columbia Field	65.6568	2.1886		
300 Area			42.4868	1.4162
TOTAL	407.3368	13.5779	406.0893	13.5363

Maximum daily consumption was 21,129,400 gallons on 4-21-54.

SEWERAGE SYSTEM

Approximately 135,000 gallons of sludge were drawn from the digestors to the drying beds.

The digestor heat exchange pump was completely overhauled and returned to service. During overhaul of this pump the digestor internal heat exchange coils were in service, but due to a large sludge draw off, the digestor temperature dropped from 90°F to 87°F.

Normal operation and maintenance of the collection system and treatment plant was continued.

SEWAGE

	Total Flow Million Gallons	Average Daily Flow Million Gallons
Plant No. 1	30.880	1.029
Plant No. 2	64.320	2.144
TOTAL	95.200	3.173

IRRIGATION SYSTEMS

Installation of a four foot temporary fence of hog wire and barb wire along the west side of the canal from Sanford to the By-Pass and along both sides of the canal from existing chain link fence north of Van Giesen to the wooden flume at the By-Pass, was completed 4-16-54.

Water was turned into the Richland canal on April 16, and activation of the six irrigation pumping stations was started on April 21.

At the end of the month all stations were in service, but several distribution mains had been isolated awaiting repairs to the piping.

The 6" irrigation main through the Catholic Church property has been abandoned and the tying of the outlets formerly served by this main to other water sources is now in process.

1214330

COMMUNITY OPERATIONS SECTION
RECREATION AND CIVIC AFFAIRS UNIT
MONTHLY REPORT
APRIL 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Beginning of Month	3	2-1/2
New Hires	0	0
Terminations	0	0
Transfers - In	0	0
- Out	0	0
End of Month	3	2-1/2

SCHOOLS

The following is a tabulation of full-time paid School District #400 personnel as of April 30, 1954:-

Administration	7
Principals and Supervisors	14
Clerical	25
Teachers	304
Health Audiometer	0
Cooks	44
Bus Drivers	1
Maintenance	21
Operations	46
	462

CLUBS AND ORGANIZATIONS

As of April 30, 1954, the employees of the listed organizations, exclusive of those included in the Real Estate, Commercial and Other Properties Unit Report, include:-

Youth Council	1
Boy Scouts	1
Campfire Girls	1
Hi-Spot Club	2
Girl Scouts	2
Justice of the Peace	1
Y.W.C.A.	2
Chamber of Commerce	1
	11

1214331

The number and types of organizations presently served by the Recreation and Civic Affairs Unit include:

Business & Professional Organizations		23
Churches and Church Organizations		27
Civic Organizations		19
Schools		10
Fraternal Organizations		25
Political Organizations		5
Recreation and Social Clubs -	Alumni	3
	Arts, Music, and Theater	11
	Bridge	5
	Dance	3
	Garden	3
	Hobby	9
	Social	11
	Sports	19
Veteran and Military Organizations		14
Welfare Groups		7
Youth - Boy Scouts		20
Girl Scouts		49
Campfire Girls		36
Miscellaneous		15
		314

RECREATION

The regular monthly meeting of the Parks and Recreation Board was held on April 7, 1954. The Board was advised that sixty-five (65) shade trees had been planted in the area north of Lee Boulevard at Riverside Park to a point just south of the Yacht Club gate ramp. The Board was informed that two (2) new signs reading, "No Dogs Allowed" will be posted at the north and south sections of the presently developed Riverside Park. The next regular meeting of the Board is scheduled for May 5, 1954.

On April 25, 1954, Wellsian Lake was opened for Juvenile fishing, with approximately six-hundred (600) youth and four-hundred (400) adults in attendance throughout the day.

The finals of the Junior High School and Senior High School Table Tennis Tournament, sponsored by the Unit, were held on April 25, at the Community House. Trophies were presented to the first and second placed winners.

On April 30, 1954, the all-city finals of the Yo Yo Contest were held at the Community House

1210332

Attendance Statistics - April, 1954

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
A. Community House					
I. Rec. Unit Supervised Programs					
Games Room Activities	26	1702	325		2027
Movies	1	98	4		102
Square Dancing Elementary	1	100	10		110
Square Dancing Juniors	1	50	2		52
Triple-O-League	1		14		14
II. Affiliated Programs					
Hi-Spot Club (Teen Age)	8	2713	34		2747
Rec-A-Teers (Young Adults)	5		484		484
Fencing	4		25		25
Jr. Stamp Club	1	11	2		13
Int'l. Folk Dancers	9	1	114		115
G.E. Women's Club	1		30		30
Rich. Rod & Gun Club	3	148	161		309
Y.W.C.A. Supper Club	3	8	115		123
Jr. Symphony	4	65	15		80
Jr. Sportsman Club	2	58	4		62
Allied Arts Assn.	2		14		14
Jr. Philharmonic	2	52	25		77
III. Rec. Unit Special Events					
Yo Yo Contest	1	20		45	65
IV. Non-Unit Special Events					
None					
V. Other Comm. House Bookings	53	724	1159	150	2033
Sub-Totals	128	5750	2537	195	8482
B. Parks and Playgrounds					
I. Rec. Unit Supervised Programs					
Juvenile Fishing	6	2575	594		3169
General Play - Riverside	23	1500	1000		2500
II. Affiliated Programs					
None					

121333

RECREATION AND CIVIC AFFAIRS UNIT — APRIL, 1954

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
III. Rec. Unit Special Events					
None					
IV. Non-Unit Special Events					
Little League Jamboree	1	180	30	350	560
V. Baseball & Softball Bookings					
All Fields	245	4190	1000		5190
VI. Estimated Use of Non-Supervised Playgrounds					
Columbia Playfield - School Use	22	8250	60		8310
Neighborhood Playgrounds	30	3000	500	___	3500
Sub-Totals	327	19695	3184	350	23229

SUMMARY OF STATISTICS

	No. of Sessions	Youth	Adults	Spectators	Sub-Total
Community House	128	5750	2537	195	8482
Parks & Playgrounds	327	19695	3184	350	23229
Total April Attendance	455	25445	5721	545	31711

Grand Total for April 31,711
Cal. Year Total To Date 67,659

121334

COMMUNITY OPERATIONS SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
APRIL 1954

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees - Beginning of Month	3	8
Transfers In	0	0
Transfers Out	0	0
New Hires	1	0
Terminations	0	0
End of Month	4	8

GENERAL

Circulation

Books	18,190
Magazines	563
Pamphlets	60
Records	1,008
Inter-Library Loans	78
Grand Total	19,899

Current Book Stock

Books added this month	545
Books withdrawn this month	0
Grand Total	29,268

Registration

Adult	172
Juvenile	49
Total	221
Total Registered Borrowers	15,975

Children's Story Hour discontinued for month of April

214335
Meetings in North Hall 26

Mrs. Joyce Bliss joined the library staff as Children's Librarian on April 26. Mrs. Bliss is a graduate of the Denver University School of Librarianship and has had five years experience as Children's Librarian at the Mid-Columbia Library in Kennewick.

Because of the lack of a Children's Librarian on the library staff the pre-school story hours were discontinued for the month of April. They will be resumed on May 4.

The Richland School of Art sponsored an art display in North Hall this month.

1214336

COMMUNITY OPERATIONS SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
APRIL 1954

ORGANIZATION	Exempt	Non-Exempt
Employees - Beginning of Month	17	32
Transfers In	0	1
Transfers Out	0	0
New Hires	0	1
Terminations	0	2
Total - End of Month	17	32

GENERAL

Surveys were made this month by our traffic control group to obtain information necessary to drawing up bids and contracts in connection with the spring street striping program. Items to be included in this program are painting of certain center-lines, curbings, cross-walks, street stencils, street parking stalls, and parking stalls located in the parkway in downtown Richland.

Sergeants G. A. Mumper and W. H. Gordon of this department attended the Washington-Oregon-British Columbia Safe Burglary Conference held in Spokane on April 29.

A supply of new police breast shields were received this month for patrolmen and sergeants. These new shields have the Washington State seal imprinted in place of the General Electric seal.

Sergeant H. V. Meigs spoke to the John Ball P.T.A. on the subject of Child Safety, To and From School, covering precautions children should take with regard to being approached by strangers, etc.

Five groups of Boy Scouts and 1 Camp Fire group were escorted on a tour of Police Headquarters during the month of April.

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TRAFFIC	1954		1953		1954 Total To Date	1953 Total Same Period
	Mar.	Apr.	Mar.	Apr.		
Reportable accidents	14	20	30	30	91	92
Property damage accidents	10	19	18	26	80	83
Injury accidents	4	1	2	4	11	8
Total persons injured	4	1	3	4	11	9
Fatal accidents	0	0	0	0	0	1
Accidents-Daylight hours	11	10	12	17	57	55
-Darkness	3	10	8	13	34	37
Accidents-Business district	3	7	4	15	25	38
" Residential	9	11	15	13	53	40
" Other	2	2	1	2	13	14
Accidents investigated	9	14	13	22	50	58
Criminal complaints filed	5	14	8	19	34	45
Violations contributing to accidents:						
Negligent driving	3	6	3	8	19	14
Fail.to yield r.o.w.	3	4	3	8	18	33
Following too closely	3	5	5	3	20	15
Drunk driving	0	1	0	1	1	1
Pedestrian violation	0	0	1	1	0	2
Inattention to driving	0	0	0	1	0	1
Reckless driving	1	1	1	1	3	3
Speeding	0	0	0	0	1	2
Unsafe speed	0	0	0	1	19	1
Improper backing	3	1	3	0	4	6
Disregarding stop sign	0	0	2	0	0	4
Hit and run	0	0	1	0	0	1
Improper passing	0	0	1	0	0	1
Improper turn	0	0	0	0	1	0
Failure to signal	0	1	0	0	1	0
Wide right turn	0	1	0	0	1	0
Wrong side of road	0	0	0	0	0	0
Defective equipment	0	0	0	0	0	0
Bicycle violation	1	0	0	0	1	0
North Richland:						
Reportable accidents	7	10	10	10	34	35
Property damage accidents	6	8	8	9	29	31
Injury accidents	1	2	2	1	5	4

Richland	1954 March	1954 April	Ave.Per Accident 1954		Ave.Per Accident 1953 March	Ave.Per Accident 1953 April
Accident property damage	$3,255.00	$5,816.00	$232.50	$306.10	$165.51	$174.64

12 4338

TRAINING

Advance training for Richland Police members at the Small Arms Range for the period in Field Instruction was as follows:

38 Caliber Revolver ½ Hour
Total number of men reporting at the range 6
Number of men fired over the Army-L Course 6

Qualifications on the Army-L Course as follows:

Sharpshooter	3	50%
Marksman	3	50%

ACTIVITIES AND SERVICES	March		April	
	Richland	North Richland	Richland	North Richland
Bank escorts and details	2	6	4	8
Bicycles impounded	2	0	0	1
Bicycle violations	0	1	0	0
Bicycles registered	40	0	560	0
Children lost or found	9	4	23	2
Complaints investigated (no enforcement action)	45	19	72	12
Deaths reported	0	1	2	0
Dog, cat, loose stock complaints	3	0	6	1
Dogs, cats, reported lost or found	17	0	9	0
Doors, windows found open in facilities	44	5	34	6
Emergency messages delivered	22	106	29	101
Fires investigated	9	8	9	2
Guns registered	9	0	2	0
Law enforcement agencies assisted	3	0	10	1
Letters of inquiry	91	0	85	0
Miscellaneous escorts	6	8	8	4
Persons injured by dogs	2	0	0	1
Plant departments assisted	13	1	14	0
Prisoners processed through Jail	10	15	17	17
Private individuals assisted	10	6	11	1
Property lost or found	34	1	24	0
Records inquiries	160	0	120	0
Reports processed through Records	260	210	235	104
Street lights out reported to Electrical	176	31	130	30
Traffic safety meetings (April attendance 1670)	13	0	32	0
Total	980	422	1436	291

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
(RICHLAND - NO. RICHLAND)
APRIL 1954

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER*		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART I								
1. Criminal Homicide								
a. Murder & Non-Neg. Mans.								
b. Mans. by Negligence								
2. Rape								
3. Robbery								
4. Aggravated Assault	-	1	-	-	-	-	-	1
5. Burg.-Break. & Entry	3	-	1	-	-	-	-	-
6. Larceny Over $50.00	1	1	-	-	-	-	-	-
Under $50.00	29	10	4	1	5	-	7	2
7. Auto Theft	2	-	2	-	-	-	-	-
TOTAL PART I CASES	35	12	7	1	5	-	7	3
PART II								
8. Other Assaults	1	2	-	-	-	-	1	2
9. Forgery & Counterfeit	-	-	-	-	-	-	1**	-
10. Embezzlement & Fraud	2	-	-	-	2	-	-	-
11. Stolen Prop:Buy:Rec.	-	-	-	-	-	-	-	-
12. Weapons: Carry: Poss.	-	-	-	-	-	-	-	-
13. Prostitution	-	-	-	-	-	-	-	-
14. Sex Offenses	3	-	-	-	-	-	2	-
15. Offenses Ag.Fam.& Child	1	1	-	-	1	1	-	-
16. Narcotics	-	-	-	-	-	-	-	-
17. Liquor Laws	-	2	-	-	-	2	-	-
18. Drunkenness	4	5	-	-	-	-	4	5
19. Disorderly Conduct	-	-	-	-	-	-	-	-
20. Vagrancy	2	1	-	-	-	-	2	1
21. Gambling	-	-	-	-	-	-	-	-
22. Driving While Intoxicated	3	7	-	-	-	-	3	7
23. Viol. Rd. & Dr. Laws:								
Fail. to Stop & Identify	1	-	-	-	-	-	1	-
Speeding	14	8	-	-	-	-	14	8
Stop Sign	7	7	-	-	-	-	7	7

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHER**		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART II								
Reckless Driving	13	1	-	-	-	-	13	1
Right of Way	4	-	-	-	-	-	4	-
Negligent Driving	19	9	-	-	-	-	19	9
Defective Equipment	-	4	-	-	-	1	-	3
Illegal Passing	1	4	-	-	-	-	1	4
24. Parking	14	53	-	-	-	6	14	47
25. All Other Traffic Viol.	17	6	-	-	-	-	17	6
26. All Other Offenses:								
Malicious Mischief	2	2	-	-	1	1	-	-
Vandalism	28	2	-	-	6	-	-	-
Joyriding	-	2	-	-	-	-	-	-
Family Disturbance	-	1	-	-	-	1	-	-
Investigation	1	2	-	-	-	2	-	-
Prowler	2	-	-	-	-	-	-	-
Molesting	2	-	-	-	1	-	1	-
Illegal Shooting	2	-	-	-	2	-	-	-
Disturbing The Peace	2	-	-	-	-	-	2	-
Pickup for Outside Agency	4	-	-	-	2	-	2	-
Damage to Property	2	-	-	-	-	-	-	-
27. Suspicion	-	-	-	-	-	-	-	-
TOTAL PART II	151	119	-	-	15	14	108	100
PART III								
28. Missing Persons	3	-	-	-	3	-	-	-
Lost Persons	19	-	-	-	19	-	-	-
Lost Animals	4	1	-	-	1	-	-	-
Lost Property	24	3	-	-	17	-	-	-
29. Found Persons	-	-	-	-	-	-	-	-
Found Animals	7	-	-	-	4	-	-	-
Found Property	22	1	-	-	15	1	-	-
TOTAL PART III	79	5	-	-	59	1	-	-

121434

OFFENS.	KNOWN		UNFOUNDED		CLEARED OTHER**		CLEARED ARREST	
	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.	Rich.	No. Rich.
PART IV								
30. Fat.M.V.Tr. Acc.	-	-						
31. Pers.Inj.M.V.Tra.Acc.	1	2						
32. Prop.Dam.M.V.Acc.	18	8						
33. Other Traffic Acc.								
34. Public Accident)								
35. Home Accidents)	No Accurate Statistics Kept							
36. Occupational Acc.)								
37. Firearms Accidents	1				1			
38. Dog Bites	-	1						
39. Suicides								
40. Suicide Attempts								
41. Sud. Death & Bod. Found								
42. Sick Cared For								
43. Mental Cases								
TOTAL PART IV	20	11			1			
COMPOSITE TOTALS								
PART I, II, III, IV CASES	285	147	7	1	80	15	115	103

*Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: order from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest. **One Forgery cleared by arrest for the previous month.

Property reported stolen	Richland	$1,447.50
Property reported stolen	No. Rich.	$ 277.50
Property recovered	Richland	$ 101.75
Property recovered	No. Rich.	$ 50.00

1214342

RICHLAND POLICE DEPARTMENT
(COMMUNITY OF RICHLAND)

Number of offenses known to police per 25,000 inhabitants in cities of 25,000 persons:

Wash.Ore. & Calif. Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 March	1954 April
Murder	.383	.064	-	-	-
Robbery	11.925	1.988	-	-	-
Agg. Assault	9.95	1.659	-	-	-
Burglary	73.55	12.259	19	2	3
Larceny	210.53	35.089	116	20	30
Auto Theft	39.23	6.538	4	2	2

Number of offenses known to police per 25,000 inhabitants regardless of whether offenses occurred in cities or rural dist

State of Washington Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 March	1954 April
Murder	.371	.062	-	-	-
Robbery	8.43	1.403	-	-	-
Agg. Assault	2.03	.338	-	-	-
Burglary	62.28	10.38	19	2	3
Larceny	188.38	31.397	116	20	30
Auto Theft	34.0	5.667	4	2	2

The percentage of offenses committed by persons under the age of 25 years is shown:

	Richland 1953 Jan. - June	Richland 1954 March	1954 April
Robbery	-	-	-
Burglary	28%	50%	-
Larceny	16%	20%	23%
Auto Theft	17%	-	-

Note: Comparative statistics for juvenile offenses are not available in current issues of the Uniform Crime Report published by the Federal Bureau of Investigation.

1214343

RICHLAND POL. DEPARTMENT
(COMMUNITY OF .ITH RICHLAND)

Number of offenses known to police per 10,000 inhabitants in cities of 10,000 persons:

Wash.Ore. & Calif. Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 March	1954 April
Murder	.153	.026	-	-	-
Robbery	4.77	.795	-	-	-
Agg. Assault	3.98	.663	1	-	1
Burglary	29.42	4.903	4	-	-
Larceny	84.21	14.035	52	8	11
Auto Theft	15.69	2.615	5	2	-

Number of offenses known to police per 10,000 inhabitants regardless of whether offenses occurred in cities or rural dist

State of Washington Six Months (Jan.-June 1953)		One Month Average	1953 Jan. - June	1954 March	1954 April
Murder	.153	.026	-	-	-
Robbery	3.37	.562	-	-	-
Agg. Assault	.81	.135	1	-	1
Burglary	24.91	4.152	4	-	-
Larceny	75.35	12.588	52	8	11
Auto Theft	13.60	2.267	5	2	-

The percentage of offenses committed by persons under the age of 25 years is shown:

	No. Richland 1953 Jan. - June	No. Richland 1954 March	1954 April
Robbery	-	-	-
Burglary	-	-	-
Larceny	12%	13%	9%
Auto Theft	9%	-	-

Note: Comparative statistics for juvenile offenses are not available in current issues of the Uniform Crime Report published by the Federal Bureau of Investigation.

1214344

MONTHLY REPORT — RICHLAND POLICE DEPARTMENT — JUVENILES INVOLVED — APRIL

OFFENSES	NO. CASES	JUVENILES	SEX	4	5	6	7	9	11	12	13	14	15	16	17
RICHLAND															
Larceny	6	11	M						1		4	3	1	2	
	1	1	F										1		
Vandalism	5	9	M	1		2	1	1	2	1	1				
	2	2	F		1		1								
Illegal Shooting	1	1	M									1			
Molesting	1	1	M										1		
Mischief	1	3	M										1	2	
TOTALS	17	28		1	1	2	2	1	3	1	5	4	4	4	
NORTH RICHLAND															
Larceny	2	3	M										1		2
Mischief	1	2	F						2						
TOTALS	3	5							2				1		2

GR-23

1214345

RICHLAN OLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
APRIL 1954

VIOLATION	NO OF CASES	NO OF CONV.	NO OF FORF.	CASES CONT.	CASES DISM.	WARR. ISS.	SENT. JAIL	SENT SUSP.	LIC. SUSP. OR REV.	CASES ORIG. PREV. MON.	CASES INCL. OTHER VIOL.	BAIL FORF.	FINES	FINES SUSP.
DEFECTIVE EQUIPMENT	1	1										$	$ 10.00	$
DRUNK DRIVING	3	2		1					2				105.00	
EXCESSIVE NOISE	2	2											7.00	
F.T. DIM LIGHTS	3	1	2									17.50	5.00	5.00
F.T. SIGNAL FOR TURN	1	1											7.50	
F.T.S. & I.	1	1					1							
F.T.Y.R.O.W.	4	4								1			60.00	45.00
FOLLOWING TOO CLOSE	2	2											30.00	15.00
ILLEGAL PARKING	25	10	13	2						1		45.50	35.00	31.50
ILLEGAL PASSING	2	2											17.50	5.00
ILL. USE OF 1 WAY ST.	2	1	1									15.00	10.00	
ILLEGAL TURN	2	2								1			17.50	5.00
INVALID DRIVERS LICENSE	11	8	3							2		18.50	50.00	20.00
INVALID LICENSE PLATE	2	1	1									7.50	10.00	
NEGLIGENT DRIVING	24	19	3	1	1				2			75.00	297.50	30.00
NO REGISTRATION	1	1											7.50	7.50
RECKLESS DRIVING	9	7			1	1	1		5				255.00	29.00
SPEEDING	14	6	6	1		1				1		75.00	60.00	12.50
STOP SIGN	7	2	5							1		50.00	15.00	7.50
VIOLATION OF S.R. ACT	1			1										
INDECENT ASSAULT	2	1			1		1							
PETIT LARCENY	1	1					1							
PUBLIC INTOXICATION	4	2	2									25.00	27.50	
PUBLIC NUISANCE	1				1									
RESISTING ARREST	1	1					1							
VAGRANCY	2	1	1				1					15.00		
TOTAL	128	79	37	6	4	2	6		9	7		$344.00	$1027.00	$213.00

FIVE RECKLESS DRIVING CASES AMENDED TO NEGLIGENT DRIVING.

GR-25

1214346

RICHLAND POLICE DEPARTMENT
NORTH RICHLAND JUSTICE COURT CASES
APRIL 1954

VIOLATION	NO OF CASES	NO OF CONV.	NO OF FORF.	CASES CONT.	CASES DISM.	WARR. ISS.	SENT JAIL	SENT SUSP.	LIC. SUSP. OR REV.	CASES ORIG. PREV. MON.	CASES INCL. OTHER VIOL.	BAIL FORF.	FINES	FINE SUSP
DEFECTIVE EQUIPMENT	2	1	1									$ 7.50	$ 5.00	$ 5.00
DISREGARDING EXISTING ROAD CONDITIONS	1		1									15.00		
DRUNK DRIVING	4	4							4				260.00	
F.T. DIM LIGHTS	1		1									10.00		
F.T.Y.R.O.W.	2	1			1					1			10.00	10.00
ILLEGAL PARKING	77	8	49	20								168.00	28.00	24.50
ILLEGAL PASSING	3		2	1						1		15.00		
ILL. USE OF 1 WAY ST.	2	1	1									10.00	5.00	
INVALID DRIVERS LICENSE	5	4			1		1						15.00	10.00
INVALID LICENSE PLATE	2		1		1							10.00		
LEFT VEHICLE WITH MOTOR RUNNING	1		1									7.50		
NEGLIGENT DRIVING	14	11	2	1			1			1		75.00	195.00	15.00
RECKLESS DRIVING	5	5							4				262.50	
SPEEDING	6		6									57.50		
STOP SIGN	9	1	7	1						2		72.50	10.00	10.00
CONT. TO DEL. OF A MINOR	1	1											50.00	
INDECENT ASSAULT	2	1		1			1							
PUBLIC INTOXICATION	5	4	1				1					12.50	52.50	
THIRD DEG. ASSAULT	3	2			1		2							
TOTAL	145	44	73	24	4		6		8	5		$460.50	$893.00	$74.50

ONE ASSAULT WITH A DEADLY WEAPON CASE AMENDED TO THIRD DEGREE ASSAULT.
TWO RECKLESS DRIVING CASES AMENDED TO NEGLIGENT DRIVING.
TWO DRUNK DRIVING CASES AMENDED TO RECKLESS DRIVING.
ONE DRUNK DRIVING CASE AMENDED TO NEGLIGENT DRIVING.

1214347

POLICE DEPARTMENT TRAFFIC CONTROL STATISTICS
A IL - 1954

MOTOR VEHICLE ACCIDENTS REPORTABLE:

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	March	April	March	April	March	April	March	April
Richland	14	19	0	0	0	0	4	1
North Richland	6	10	0	0	0	0	1	2

ACCIDENT CAUSES:

	Negligent Driving		Failure to Yield Right of Way		Reckless & Drunken		Other Causes	
	March	April	March	April	March	April	March	April
Richland	3	5	3	4	1	2	7	8
North Richland	1	2	2	3	0	1	3	4

PLANT WARNING TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Parking		Imp. License		Def. Equipment		Other V.		Totals	
	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	Apr.	Mar.	April	Mar.	Apr.	Mar.	Apr.
Richland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No Richland	0	0	0	0	2	6	0	0	0	1	0	0	2	7

TRAFFIC CHARGES AND COURT CITATION TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Drunken Dr.		Reckless Dr.		Right of Way		Neg. Drv.		Parking V.		Other V.		Totals	
	Mar.	Apr.	Mar.	Apr.	Mar.	April	Mar.	April	Mar.	April	Mar.	Apr.	Mar.	April	Mar.	Apr.	Mar.	Apr
Richland	14	13	14	6	2	3	4	14	6	3	14	19	30	24	41	28	125	110
NoRichland	10	6	15	7	4	7	2	5	3	1	7	10	96	77	42	16	179	129

TRAFFIC VOLUME COUNT: 24 Hour Traffic Volume Count on Goethals Drive, Lee and Knight 11,700 vehicles.

NOTE: TRAFFIC CONTROL STATISTICS SHOW ORIGINAL CHARGES ONLY

GS-26

1210348

COMMUNITY OPERATIONS SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT
APRIL 1954

Organization and Personnel	Exempt	Non-Exempt
Employees - Beginning of Month	68	0
Transfers In	0	0
Transfers Out	0	0
Terminations	1	0
New-Hires	0	0
End of Month	67	0

Fire Protection		Richland	North Richland
Fire Loss (Estimated):	Government	$1,200.00	0.00
	Personal	199.00	0.00
	April Total	$1,399.00	0.00
	Year's Total	$1,845.00	$3,781.00

Response To Fire Alarms	22	27
Investigation of Minor Fires and Incidents	1	0
Ambulance Responses	33	
Inside Schools or Drills	29	5
Outside Drills	28	17
Safety Meetings	8	3
Security Meetings	3	3
Fire Alarm Boxes Tested	212	108

Fire Department personnel provided artificial respiration instruction during April for twelve groups totalling 214 people, of whom all but 5 were General Electric employees.

Supervisory training sessions attended by Fire Department officers included Captain C. M. Wight and Lieutenant J. A. Riggs to Hobso II, Captain E. A. Mitchell to Conference Leading and Captain R. W. Hatfield to Human Relations.

Assistant Chief Quane instructed 25 volunteer Civil Defense workers in Household Fire Fighting.

One Boy Scout was examined for Firemanship Merit Badge at No. 2 Fire Station.

Fire Prevention

A hundred sixteen Richland and 43 North Richland fire inspections resulted in 7 written hazard reports. Two hundred twenty one fire extinguishers were inspected, 47 serviced, 12 installed, 8 removed and 8 refilled. Sixty standpipe fire hoses were also inspected.

Efforts were made to bring about some changes in fencing south of the 703 Building to improve Fire Department access to fire hydrants in this area.

1214349

Assistance given the Chamber of Commerce Clean-Up Week Committee for their April 18-24 campaign included providing photos and publicity material, distribution of posters to merchants, spot inspections of commercial firms and helping with special movie for children turning in boxes of trash.

Insulating new light fixtures from combustible ceilings was recommended in a commercial firm.

The Fire Department assisted 700 Area Maintenance with test flushing of 703 Building automatic sprinkler system on April 17th.

Assistance was given School maintenance personnel during tests of auxiliary fire alarm systems in five schools and the maintenance shop building, after which a report of the tests was submitted to School officials.

A review of the plans for the new Richland Baptist Church, the proposed Central UP Church Educational building and a proposed service station at Duane and Lee resulted in recommendations to Community Engineering for certain fire safety features.

Notice was received through the Chamber of Commerce that Richland was awarded 8th place nationally and 1st place in the State of Washington in its population class in the 1953 National Fire Waste Contest.

Several conferences were held with AEC Safety and Engineering relative to converting the present automatic wet sprinklers to dry pipe systems in Kadlec Hospital. Tests of the present systems were held on April 20th.

Proposed automatic fire alarm tie-in for the new Richland Baptist Church was discussed with church officials. Preliminary inspection was made on April 21st of the automatic sprinkler installation in the basement of this building.

Investigation was made in an effort to ascertain the cause for a roof and attic fire occurring April 28th at 1437 Kimball.

Assistant Fire Marshal attended an April 30th meeting with Kadlec Hospital officials planning for the hospital's annual open house.

1214350

COMMUNITY OPERATIONS SECTION
ENGINEERING UNIT
MONTHLY REPORT
APRIL 1954

PERSONNEL:	Exempt	Non-Exempt	Total
Employees - Beginning of Month	6	3	9
Employees - End of Month	6	3	9

BUILDING PERMITS ISSUED IN APRIL

1. E. H. Kidwell Service Station, Lee and Duane
2. Richland Heights Baptist Church, Thayer and Duportail
3. Four Garage Permits issued.

NEW MUNICIPAL CONSTRUCTION STARTED IN APRIL

1. 24" Sanitary Sewer, Swift Boulevard

NEW PRIVATE CONSTRUCTION STARTED IN APRIL

1. Richland Heights Baptist Church
2. Catholic Parochial School and Convent
3. Kidwell Service Station

ENGINEERING JOBS COMPLETED DURING APRIL

ESR I 90194 Landscape Design for 300 Area - Replaced by ESR I 90944.

ESR I 90224 Inspection & Liaison, Spokane Housing

ESR I 90504 Comfort Station, Riverside Park - See Project IR-176

ESR I 90644 Air Conditioning, Community House - See Project IR-173

ESR I 90654 Legal Description, Central United Protestant Church

ESR I 90714 Legal Description, Asphalt Plant, Horn Rapids Road

STATUS OF ENGINEERING UNIT JOBS TO BE COMPLETED:

PROJECTS:

CA 577 Improvements to Existing Streets, George Washington Way, FY 1954 - Preliminary Survey completed.

CA 570 Replace Raw Water Line, #5 Well to Lee Boulevard - Design progressing. 40% complete.

K-811 Extend Sewer to New Commercial Building, Hartford and Duportail - Construction 90% complete. Awaiting scheduling of seeding to complete the project.

214351

ENGINEERING UNIT (Cont)

STATUS OF JOBS (Cont.)

L 728 Installation Fire Insulated Fire Alarm Wire - To be completed as locations furnished by Fire Department.

L 384 Improvements to Medical Arts Building, Service Drive - Design complete. Plans and specifications ready for contracting.

L 394 Replace Tennis Court Fences, Riverside Park - Bid opening on April 22, 1954. Recommendation of award submitted April 27, 1954.

IR 167 Erosion Control & Development, FY 1953, Part I - Design complete. Plans and specifications ready for contracting.

IR 165 Parking Facilities, Kadlec Hospital - Design complete. Plans and specifications ready for contracting.

IR 171 Automatic Bar Screens, Sewage Lift Station - Plans and specifications have been forwarded to AEC for review.

IR 173 Air Conditioning, Community House - Design 75% complete.

IR 174 Electricity Metering, Richland Domestic Water System - Equipment being ordered.

IR 175 Expansion of Riverside Park - Design complete. Plans and specifications ready for contracting.

IR 176 Comfort Station, Sewage Lift Station, Chlorination Station, Riverside Park - Design 80% complete.

ENGINEERING SERVICE REQUESTS:

I 90014 Free Methodist Church - Construction 99% complete. No progress this month.

I 90024 First Baptist Church (Richmond and Raleigh Streets) - Construction 92% complete. Progressing very slowly.

I 90034 Assembly of God Church - Construction 81% complete. Work progressing very slowly.

I 90044 Alteration Permits - An open active file. 4 garage permits and 3 sign permits issued in April.

I 90054 Engineer Liaison, Richland Water - Following construction and providing liaison as requested.

I 90064 Television Antennae - An open active file, no permits issued in April.

1214352

ENGINEERING UNIT (Cont.)

STATUS OF JOBS (Cont.)

I 90094 Plans, Specs., Inspections, Grace Bacon Roller Rink - Construction 98% complete. No progress this month. Open for business.

I 90104 Plans, Specs., Inspections, Newberry Store - Construction 99% complete. Exceptions not entirely cleared. Open for business.

I 90114 Plans, Specs., Inspections, Latter Day Saints Storehouse - Construction 99% complete. No progress this month.

I 90124 Plans, Specs., Inspections, American Legion - Construction 99% complete. All exceptions not cleared. Open for business.

I 90154 Plans, Specs., Inspections, Parcell Service Station, Duportail and Hartford - 70% complete. Construction progressing on schedule.

I 90184 Plans, Specs., Inspections, Safeway Store - 50% complete. Construction progressing rapidly after initial delays.

I 90204 Plans, Specs., Inspections, EH Kidwell Service Station - 2% complete.

I 90234 Inspection & Liaison, Bauer-Day Housing - 99% complete.

I 90244 Plans, Specs., Inspections, Church of Nazarene Addition - 67% complete. Construction progressing slowly.

I 90254 Plans, Specs., Inspections, Seattle First National Bank Addition - Construction 99% complete. Final inspection to be made. Open for business.

I 90264 Plans, Specs., Inspections, Richland Heights Baptist Church - Construction started April 26, 1954.

I 90274 Inspection, McMurray Road - Asphaltic concrete surfacing to be completed in May.

I 90324 Design, Engineering, Inspection, Walks and Drives at Columbia Playfield - Design complete. Plans and specifications ready for contracting.

I 90334 Plans, Specs., Inspections, Richland Baptist Church, G.W.W. - 45% complete. Construction progressing rapidly.

I 90354 Water System Study for Irrigation System Disposal - Preliminary scoping complete. Awaiting further disposition by AEC.

I 90374 Plans, Specs., Inspections, LG Cook Construction & Maintenance Building, Main Building - Construction 99% complete. Final inspection to be made. (For second addition, See ESR I 90684)

1214353

ENGINEERING UNIT (Cont.)

STATUS OF JOBS (Cont.)

I 90474 Part II, Erosion Control & Development, Public Areas, FY 1953 - Proposals in study stage.

I 90504 Plans, Specs., Inspections, Pleiss-Davis Addition - Awaiting final inspection.

I 90594 "As Builts" General, Part II - Work delayed by current design and construction rush, but work progressing slowly.

I 90604 Inspection 24" Sanitary Sewer, Swift Boulevard - Construction 30% complete, and progressing steadily.

I 90614 Legal Description, Parking Lot, Baptist Church, G.W.W. - 95% complete.

I 90624 Title III Services, Storm Drain, George Washington Way - Contractor given notice to proceed, but construction not started to date.

I 90634 Kadlec Hospital Grounds Improvements - Design complete. Plans and specifications ready for contracting.

I 90674 Utility Lines, Plots for Churches - 95% complete.

I 90684 Plans, Specs., Inspections, LG Cook Building Addition - 30% complete. Construction progressing slowly.

I 90704 Plans, Specs., Inspections, Christ the King Parish (Catholic) - Excavation started April 19, 1954. Issue of building permit delayed pending correction of Code exceptions to originally submitted plans.

I 90724 Extension Duane Avenue Shelterbelt - Scoping and estimates for project proposal have been completed.

I 90734 Sewer and Water connections, Richland Heights Baptist Church, Thayer and Duportail - Design sketch prepared for early construction.

I 90754 Legal Description & Diagrams, Churches - 95% complete.

I 90764 Plans and inspections, Rest Rooms, Desert Inn - Construction 95% complete. Work progressing rapidly.

I 90774 Legal Description with utilities and plot drawing, SE corner Lee Blvd. and Wellsian Way - 75% complete.

I 90784 Legal Description with utilities, Plot SW Corner Skyline Theater - 95% complete.

I 90794 Legal Description with utilities, Junior Chamber of Commerce - 95% complete.

1214354

ENGINEERING UNIT (Cont.)

STATUS OF JOBS (Cont.)

I 90804 Legal Description, Safeway Building #1 - To be started.

I 90814 Legal Description, Plot West of By's Burgers - 15% complete.

I 90824 Legal Description, Plot on East Side of Wellsian Way - 50% complete.

I 90834 Legal Description, Burlin Camp Area - 75% complete.

I 90844 Plans, Specs., Inspections, Central UP Church - Awaiting completion of plan review by reviewing agency.

I 90854 Legal Description, Area East of Stevens between Lee and Knight - 50% complete.

I 90864 Legal Description, Site A, Corner of Goethals and Williams - 25% complete.

I 90874 Legal Description, Site B, Corner of Goethals & Williams - 25% complete.

I 90884 Relocate Water Line, Lee Blvd. and Duane Avenue - Design complete. Plans and specifications ready for contracting.

I 90894 Legal Description, Plot south of Linn Motors - 50% complete.

I 90904 6" Water Main, Stevens Drive, Kadlec Hospital to Central UP Church - Preliminary field work in progress.

121355

COMMUNITY REAL ESTATE SECTION

APRIL 1954

ORGANIZATION AND PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Nonexempt	Exempt	Nonexempt
Real Estate Administration 350	2	1	2	1
Housing & Maintenance Unit				
351	4	17	4	18
353	11	137	10	141
Commercial Property Unit 357	6	6	6	5
	23	161	22	165

Increase in number of employees 3

The increase in nonexempt personnel is due to receipt of replacements for employees who had transferred or terminated during the month of March.

214356

HOUSING AND MAINTENANCE UNIT

April, 1954

ORGANIZATION AND PERSONNEL

Number of employees on the payroll:

Beginning of month:	15	exempt
	154	nonexempt
	169	
End of month:	14	exempt
	159	nonexempt
	173	

The increase in nonexempt personnel is due to receipt of replacements for employees who had transferred or terminated during the month of March.

1214357

RICHLAND HOUSING

[illegible]NG UTILIZATION AS OF MONTH ENDING APRIL 30, 1954
[illegible]S OCCUPIED BY FAMILY GROUPS

	Conven	A&J	T	Pre Cut	Ranch	Pre fab	Dorm Apt.	A&J Apt.	2BR Apt	4th Hsg.	Tract	Total
G.E.Employees	2229	253	10	385	833	1136	10	53	59	199	37	5204
Comm. Fac	91	18		30	62	50		5	3	8	2	269
AEC	74	26		21	59	16		6	5	15	3	225
Other Gov't	8	2			3	1					1	15
Post Office	5				2	9				1	3	20
Schools	57			7	10	54			1	1		130
Comm.Activities	9			1	6	4					1	21
Med.Facilities	3	20			3	1				3		30
Chas. T. Main	3			2	5	7				2		19
Kaiser Eng.	6	8		1	6	1						22
J. A. Jones	2	2			2	1						7
Blaw-Knox	3	2		2	1							8
J. S. Lord	1				2					1		4
Nitro Corp	1				1							2
Vernita Orchards											5	5
Minor Contractors					1							1
Commonwealth Inc.						1						1
Not Certified	4	2			3	8					1	18
Total	2496	333	10	449	999	1289	10	64	68	230	53	6001
Turnovers	1					2						3
House Ex.	1				1						1	3
Total	2498	333	10	449	1000	1291	10	64	68	230	54	6007
Assigned leases written						2			1			3
Assigned leases not written	1					20			1			22
Available for assignment	1			1		2						4
Total	2500	333	10	450	1000	1315	10	64	70	230	54	6036

	Begin Month	Moved In	Moved Out	End of Month	Diff.
Conventional Type	2496	+16	-14	2498	+2
A&J Type	332	+ 2	-1	333	+1
"T" Type	9	+ 1		10	+1
Precut Type	450	+ 3	-4	449	-1
Ranch Type	1000	+ 6	-6	1000	
Prefab Type	1308	+27	-44	1291	-17
Dorm. Apts	10			10	
A&J Apts	64	+ 1	-1	64	
2BR Apts	69	+ 4	-5	68	-1
Fourth Housing	230	+ 1	-1	230	
Tracts	54			54	
Total	6022	+61	-76	6007	-15

1214358

April 1954

DORMITORY REPORT

Dormitories:

	Beds Available	Vacant Beds	Occupied Beds
Men	477	61	416
Women	381*	54	327
Total	858*	115	743*

* This includes 2 beds used for Dorm Offices

WAITING LISTS

	Single Rooms	Double Rooms
Men	0	0
Women	4	0

The following Dormitories are in Stand-by condition.

W 21-50 beds
W 17-50 beds
W 16-50 beds
W 15-50 beds
M 7-39 beds

Total Beds 239

HOUSING
CANCELLATION AND ALLOCATIONS

STRAIGHT CANCELLATIONS

Voluntary terminations	16
R. O. F.	0
Discharge	0
Transfers	4
Retirement	1
Move off project	14
Divorce	0
Death	0
Move to Wherry House	0
Misc.	0
Not eligible	2
Total-	37

ALLOCATIONS

Houses allocated to new tenants	22
Exchanged houses	18
Moves(within the village)	38
Turnovers (Divorce or Death)	5
Total leases signed	84
Total cancellations	98
Wherry house move to G.E. house	1
Houses assigned As Is	53
Houses sent to renovation	23
Applications pending	267

Removal of 65 Prefabricated Type Houses:

Excess papers have been sent to the Stores Unit on the following number of prefabricated type houses:

	1BR	2BR	3BR	Total
March	4	0	0	4
April	14	6	2	22
Total	18	6	2	26

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TENANT RELATIONS PROGRESS REPORT

	Orders incomplete as of March 26	Orders issued 3-26 to 4-30	Total Orders Incomplete as of April 30, 1954
Service orders	745	1946	574
Work orders	861	372	727
Service charges		210	

Principal work order loads

	Incomplete as of March 31, 1954	Incomplete as of April 30, 1954
Laundry tub replacement	25	16
Bathroom renovations (tub, tile, lino.)	11	11
Tileboard bathroom	7	11
Kitchen floor linoleum	65	56
Kitchen cabinet linoleum	93	62
Shower stall	20	6

---

92 alteration permits were issued, as compared to 104 issued during March.

Install air conditioner	7	Install patio	6
Install automatic dishwasher	2	Install disposal unit	2
Convert to oil	3	Install fence	25
Install automatic washer	13	Install automatic dryer	12
Install broom closet	1	Install coal stoker	1
Install greenhouse	1	Install clothes poles	1
Remove broom closet	1	Install tool shed	1
Install shortwave antenna	1	Install fishpond	1
Install driveway	2	Sand floors	1
Remove basement partitions	2	Install sprinkler system	1
Convert trailer to playhouse	1	Alter cupboard top	2
Install plastic tile	1	Install water softener	1
Move water heater	1	Basement excavation	2

---

588 inspections were made, as compared to 533 made in March.

Alteration permits	38	Basement	2
Bathroom	5	Door	5
Fill	11	Floorboard	11
House	21	Laundry trays	21
Linoleum	54	Lot lines	5
Porch & steps	23	Recall range & refer	4
Shower stall	15	Shower rods	1
Sidewalk	9	Sink	11
Toilet	1	Toilet seat	29
Trees	10	Walls	1
Windows	3	Yard	10
Miscellaneous	12	Dormitories	55
Renovations	79	Cancellations	89
Shows (new tenants)	63		

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MONTHLY PROGRESS REPORT
INTERIOR REDECORATING REPORT
FISCAL YEAR - 1954

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	165	8	165	0
B	366	6	364	2
C	0	0	0	0
D	5	0	5	0
E	42	0	42	0
F	112	5	112	0
G	3	0	3	0
H	80	3	80	0
K	0	0	0	0
L	4	0	4	0
M	2	0	2	0
Q	8	1	8	0
R	2	0	2	0
S	2	0	2	0
T	8	2	7	1
U	7	2	7	0
V	37	8	37	0
Y	197	8	197	0
Z	5	0	5	0
1BP	47	11	37	10
2BP	182	54	180	2
3BP	222	68	176	46
Tract	10	1	10	0
1 BR Apt.	11	3	11	0
W-13 Apt.	3	0	2	1
Total	1520	180	1458	62

Est. MH B. F. 62,389
This Mo. Est. MH 8,111

Total Est. 70,500

17 Units added

Actual MH B.F. 60,721
Actual MH This Mo. 8,057

Total Actual MH 68,778

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PLUMBING SHOP

JOB DESCRIPTION	NO. COMPLETED
Replacements - Major Fixtures:	
Bathtubs	4
Shower Stalls	26
Electric Water Heaters	22
Laundry Tubs	37
Plumbing Work Orders	49
Plumbing for Floor Tile Replacements	19
Cleared major sewer stoppages caused by tree roots	37
Plumbing for sink top replacements	49
Steam work orders	23

Steam inspection once a week on dormitories, apartments and Government owned commercial buildings.

Turned on all domestic irrigation water in north part of town.

Excavated with digger machine sewer lines, water mains and all leaking and broken underground piping for repairs.

Replaced street steps	13
Patched walks with blacktop	3

SERVICE ORDER CREW

The following is a status report on service orders:

A.	On hand at the beginning of the month:	444
B.	Received during the month	1707
C.	Completed during the month	1863
D.	On hand at the end of the month	288

E. A total of 286 man hours were spent on work orders.

F. Back log of service orders by craft:

Plumbing	139
Electrical	47
Carpentry	102
Total	288

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RENOVATION AND LABOR CREW

JOB DESCRIPTION	NO. COMPLETED
Renovations orders processed	25
Trash pickups	38
Minor carpenter repairs to houses	34
Minor carpenter repairs to dormitories	8
Dormitory rooms redecorated	0

Sprayed entire dormitories M-5 and M-14 for silver fish.

All occupied dormitories serviced with linen and janitorial supplies.

MECHANICAL SHOP

JOB DESCRIPTION	NO. COMPLETED

A. Millwright Crew:

Furnace service orders	107
Routine furnace inspection	235

All Precut house furnace fan motors and blowers have been completed, and routine service on ranch house furnaces is about 60% complete.

All coolers in the dormitories, Medical-Dental Clinic, Richland Theater and Village Theater have been repadded, lubricated, and the water has been turned on for ready operation.

B. Sheetmetal Crew:

Replacement of shower stalls	19
Replacement of gutters	38
Flashing around coal hatches	16
Ranch house closet tracks	48

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CARPENTRY

JOB DESCRIPTION	NO. COMPLETED
Install bathtubs	10
Replace bath wall tile	27
Repair bath wall tile	10
Replace bath floor linoleum	25
Repair bath floor linoleum	4
Replace kitchen floor linoleum	32
Repair kitchen floor linoleum	4
Replace steps and landing linoleum	1
Repair bedroom linoleum	2
Replace utility room linoleum	1
Repair living room linoleum	2
Replace kitchen sink top linoleum	100
Repair kitchen sink top linoleum	3
Replace work bench top linoleum	7
Replace kitchen sinks	6
Drill weepholes	1
Sash balances	5
Repair roofs - houses	54
Raise slab	2
Repair porches	86
Jack and shim	9
Repair wall	9
Repair floor boards	1
Chempoint - Routine	39
Chempoint - Work Orders	127
Repair thresholds	6
Repair sidewalks	3
Repair exterior doors - shop	3
Repair interior doors - shop	1
Paint touch-ups	87
Interior carpentry repair to all types of houses (4 year cycle)	87
Screen doors repaired - Shop	150

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COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION
April, 1954

PERSONNEL - COMMERCIAL PROPERTY UNIT:

	April
Beginning of Month	12
End of Month	11
Net Change	1

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	Commercial		Noncommercial		Total	
	Richland	North Richland	Richland	North Richland	Richland	North Richland
March	1,591	190	120	1	1,711	191
April	1,635	194	120	1	1,755	195
Net Change	+44	+4	0	0	+44	+4

SUMMARY OR ROUTINE ITEMS PROCESSED:

	Commercial		Noncommercial		Total		
	Richland	North Richland	Richland	North Richland	Richland	North Richland	Total
Work Orders	40	5	1	0	41	5	46
Back Charges	1	0	1	0	2	0	2
FY Work Orders	465	180	11	0	476	11	487
FY Back Charges	26	1	1	0	27	1	28

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Lease

Pleiss-Davis, Inc. - a lease of land and the government-owned Building #1125-3 situated thereon for use as a furniture warehouse.

2. Supplemental Agreements:

a. Vance Properties, Inc. - to provide for lease of land and the government-owned building situated thereon in connection with the continued operation of the Desert Inn Hotel.

b. Automatic Laundry Company - to provide for a new description of the leased premises.

214365

Noncommercial:

1. Lease:

   Corporation of the Catholic Bishop of Yakima - an interim lease covering the occupancy of Building #1112. Lease is retro-active to November 1, 1949.

GENERAL:

A. Commercial:

1. E. H. Kidwell started construction of a service station building to be located at Lee Boulevard and Duane Avenue in the Light Industrial Area.

2. Brochures describing the premises and outlining the operating experiences were prepared for three commercial facilities. These brochures were prepared for use in connection with the pending appraisals of the properties, primarily, for purposes of lease renegotiation.

3. Activities in connection with renegotiation of twenty-two Commercial Facility Leases were conducted.

4. Preliminary work in connection with advertising for lease of thirteen commercial sites was completed.

5. A request was submitted to the Richland Advisory Planning Board for consideration on land use designation for the area east of George Washington Way between Newton Street and Lee Boulevard.

B. Noncommercial:

1. A letter was sent each North Richland commercial operator and noncommercial organization notifying them that their leases would be terminated sometime after January 1, 1955, because of transfer of the North Richland Area to the United States Army

2. Two pasture permits were issued.

3. There are eighteen church organizations of which to date eleven have indicated their interest in purchasing land or buildings.

4. Pursuant to the Richland Advisory Planning Board's Recommendation #10, regarding the proposed eastward extension of Duportail Street and the relocation southward of the Richland Heights Baptist Church sites, a representative of the church was requested by letter dated April 22, 1954 to advise us of whether or not they would agree to this relocation and other zoning restrictions.

C. Sale of Church Properties:

The appraised sales price of four churches was received and approved by the Commission. Necessary action, preparatory to sale of these properties and the obtaining of appraisals of twelve additional church sites is in progress.

214366

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland:

Service Station	Equipment Yard
Drive-In Restaurant	Tavern
Drive-In Ice Cream	Dance Hall

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COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION

April, 1954

SUMMARY OF OCCUPANY AND EXPANSION STATUS

	MARCH			APRIL		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Number of Government-owned Buildings	40	8	48	40	8	48
a. Number of Prime Lessee Businesses	38	9	47	38	9	47
b. Number of Sublessee Businesses	17	0	17	17	0	17
c. Total Businesses in Government-owned Buildings	55	9	64	55	9	64
2. Doctors and Dentist in Private Practice	27	0	27	27	0	27
3. Number of Privately-owned Buildings	66	7	73	67	7	74
a. Number of Prime Lessee Businesses	41	6	47	41	6	47
b. Number of Businesses operated by Sublessees	110	1	111	110	1	111
c. Total Businesses in Privately-owned Buildings	151	7	158	151	7	158
4. Privately-owned Buildings under Construction	5	0	5	6	2	8
5. Total Number of Businesses in Operation	206	16	222	206	16	222

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COMMERCIAL PROPERTY UNIT - REAL ESTATE SECTION

April, 1954

SUMMARY OF OCCUPANCY AND EXPANSION STATUS

B. NONCOMMERCIAL:

	MARCH			APRIL		
	Richland	North Richland	Total	Richland	North Richland	Total
1. Government-owned Buildings						
a. Churches	4			4		
b. Clubs and Organizations	5			5		
c. Governmemt Agencies	2			2		
Total	11		Total	11		
2. Privately-owned Building						
a. Completed and in use	10	1	11	10	1	11
b. Under Construction	6	2	8	6	2	8
Total	16	3	19	16	3	19
3. Pasture Land Permits	0		98	0	100	100

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RADIOLOGICAL SCIENCES DEPARTMENT

APRIL, 1954

Summary

Twenty-one informal, 5 Class I and one Class II radiation incidents were recorded. The Class II incident indicated an apparent general body exposure of about 10.5 roentgens, the highest on record at the works. Conditions under which such an exposure could have been caused could not be duplicated.

The special study group on vehicle contamination obtained a satisfactory solution to the immediate problem.

Particles presumed to arise from nuclear detonations were wide-spread throughout the Pacific Northwest.

In research and development, two findings on tritium were of interest; one was a measurement of transmission of the active material through plastic sheets; the other confirmed in algae the early finding in rats that tritium once bound in the organism tends to enter metabolic pools of relatively slow turnover rate.

Ground water tests in the Gable Mountain region indicated very high local permeability and the probability of significant ground water movement toward Hanford.

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Radiological Sciences Department

RADIOLOGICAL SCIENCES DEPARTMENT

APRIL, 1954

Organization

The month-end force of 377 included 29 supervisors, 103 engineers and scientists, 19 clerical and 226 other personnel.

Number of Employees on Payroll

Beginning of month	-	377
End of month	-	377
Net change	-	0

General

There were 21 informal, 5 Class I and one Class II radiation incidents. The Class II incident indicated a body exposure of 10.5 roentgens, the highest on record at the Works. However, there appeared to be nothing in the work schedule of the affected employee that could have caused such an exposure. Diligent investigation of probable aberrations and of a considerable number of highly improbable ones failed to resolve this discrepancy.

The special study group on vehicle contamination performed an excellent piece of work in assisting others to establish an adequate decontamination facility, and in themselves doing enough experimental work to determine that the inhalation hazard from particles redistributed from vehicle surfaces is low compared with the conventionally accepted direct risk in the separations areas.

A four weeks training course in radiological sciences for a group of department personnel and invitees from the Manufacturing Department was conducted. Group lunches were held with relatively new employees of the department to promote better mutual understanding. It is proposed to extend the scope of this contact method to employees of longer standing.

A new procedure for off-site disaster monitoring was prepared at the request of the AEC. This procedure abolishes permanent teams and substitutes a random call system.

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Radiological Sciences Department

General (Continued)

Modifications of Civil Defense planning were also made to reflect a reaction to the possibility of thermonuclear attack, which involves emphasis on attempted evacuation rather than shelter.

Inventor	Title
G. E. Driver	A transistor high voltage supply

RADIOLOGICAL ENGINEERING

Work on project CG-545, Soil Science Laboratory Facilities, was completed and accepted. The Positive Ion Accelerator Laboratory equipment installation was completed.

Contamination conditions in various areas further restricted construction work proposed for off-plant contractor forces. Included was replacement effluent line work at the B and D reactors, and proposed Army site construction southeast of the 200 West Area. Significant ground contamination at the site of the proposed Physical Constants Test Reactor was noted.

Studies were completed on possible radiological effects of a major disaster of the proposed Physical Constants Test Reactor.

Investigation of the high river water design basis with respect to reactor effluent disposal indicated that reduction of the design basis from that of the 1894 flood level to allow some bank discharge under occasional high water conditions would produce no significant savings on proposed additional disposal facilities.

Ground water tests at the proposed Gable Mountain reactor effluent disposal area continued to indicate very high local permeability and the possibility of significant ground water movement probably toward Hanford. The possibility of similar ground water movement between Gable Mountain and the 200 Areas plateau is suggested. Recommendations for additional studies are in preparation.

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RADIOLOGICAL RECORDS AND STANDARDS SECTION

1. Radiation Monitoring

General Statistics

	March	April	1954 To Date
Special Work Permits	509	543	2,121
Routine and Special Surveys	1,801	1,973	6,835
Air Samples	1,376	1,649	6,439
Skin Contamination	18	17	70

A general improvement in the contamination status of railroad equipment was observed throughout the month. No railroad worker received personal contamination.

Particulate contamination continued to be detected in and around the 200 West Area. Air filter samples showed dosage rates on individual particles to be as high as 30 mrads/hr.

2. Radiological Standards

One Class II, five Class I, and 21 Informal Radiation Incidents were reported.

The Class II Incident was a reported 10.5 r whole body exposure of an Engineering Assistant at the Metallurgy Laboratory in the 108-B Building. This was the highest whole body gamma exposure reported to date at Hanford.

The Class I incidents included the exposure of several employees to high level ruthenium air contamination at a Redox analytical laboratory, ground contamination resulting from an underground process leak, plutonium contamination spread to several rooms and a corridor at the 231 isolation building, roadway contamination during the burial of equipment at the 100-B Area, and the improper moving of highly contaminated equipment at the 105-H reactor building.

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3. Exposure Records

(a) Personnel Meters, and Records and Photometry

General Statistics

	March	April	1954 Total
Gamma pencils read	218,130	232,608	883,312
Potential overexposures	9	12	46
Confirmed overexposures	0	1	2
Slow neutron pencils read	1,010*	1,288	3,824
Potential overexposures	0	0	1
Confirmed overexposures	0	0	0
Beta-Gamma film badges processed	33,577	37,273	144,216
Potential overexposures	56	29	251
Confirmed overexposures	0	1	2
Fast neutron badges processed	379	436	1,456
Potential overexposures	1	1	2
Confirmed overexposures	0	0	0
Lost readings (all causes)	65*	43	180

*Corrected totals.

(b) Bioassay

1. Plutonium Analyses

	March	April	1954 Total
Samples assayed	940	1,002	3,346
Results above detection limit*	13	38	100
Resamples assayed	56	47	161
Results above detection limit*	11	12	42
Maximum d/m/sample	2.10	1.39	2.12

*Detection limit was 0.05 d/m.

2. Fission Product Analyses

	March	April	1954 Total
Samples assayed	1,011	1,032	3,614
Results above 10 c/m/sample	1	1	10

The result above 10 c/m is under investigation.

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3. Uranium Analyses

Results of 220 samples processed this month are tabulated below. This brings the total number of samples processed in 1954 to 1105.

Sample Description	End of 4th Day Exposure /ug/liter Maximum	Average	Number Samples	End of 2 Days-No Exposure /ug/liter Maximum	Average	Number Samples
Metal Preparation	17.0	2.8	49	8.6	2.1	40
Technical	11.0	5.3	7	13.1	7.3	8
UO_3 Plant	15.8	1.8	96	-	-	-
Radiation Incidents	51.7	27.6	5	-	-	-

The radiation incident samples were all in connection with incidents previously reported.

4. Tritium Analyses

	Activity Density (/uc/cc x 10^3) 0-5	5-10	10-35	35-70	>70	Total	1954 Total
Number of Samples	369	9	3	0	0	381	1,260

(c) Thyroid Checks

All thyroid checks reported were below the warning level.

(d) Hand Score Summary

There were 35,760 alpha and 49,722 beta scores reported, all below the warning level.

4. Calibrations

	Number of Routine Calibrations March	April	1954 Total
Fixed Instruments	91	91	314
Portable Instruments	3,237	3,729	13,031
Personnel Meters	20,053	16,993	68,980
Total	23,381	20,813	82,325

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BIOPHYSICS SECTION

CONTROL UNIT

Regional Survey

The general findings are summarized in the following table:

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (/uc/cc)
Drinking Water and Related Materials		
Benton City Water Co. Well	alpha	1.4×10^{-8}
Richland, N. Richland, Benton City Wells	alpha	$(<0.5 \text{ to } 1.2) \times 10^{-8}$
100 Areas	beta	$(0.3 \text{ to } 1.1) \times 10^{-6}$
Pasco, Kennewick, McNary Dam	beta	$(0.8 \text{ to } 2.1) \times 10^{-7}$
Backwash Solids - Pasco Filter Plant	beta	0.04 to 0.18 /uc/g
Backwash Liquids-Pasco Filter Plant	beta	3.4×10^{-7}
Sand Filter-Pasco Filter Plant	beta	1.4×10^{-4} /uc/g
Anthracite Filter-Pasco Filter Plant	beta	1.2×10^{-4} /uc/g
Other Waters and Related Materials		
300 Area Wells #1, 2, 3	alpha	$(3.8 \text{ to } 9.4) \times 10^{-8}$
300 Area Well #4	alpha	No samples
Well #4 Measured as Uranium	U	
Other Wells on the Reservation	beta	$(<0.5 \text{ to } 3.4) \times 10^{-7}$
Columbia River-Hanford Ferry	beta	1.7×10^{-5}
Columbia River-Below Reactors	beta	1.7×10^{-5}
Columbia River-Patterson to McNary	beta	$(1.8 \text{ to } 3.6) \times 10^{-7}$
Columbia River-Shore Mud	beta	$(0.3 \text{ to } 2.8) \times 10^{-4}$ /uc/g
Raw Water-Operating Areas	beta	$(<0.05 \text{ to } 1.6) \times 10^{-6}$
Reactor Effluent Retention Basins to River	beta	1700-2700 /uc/sec $(5.3\text{-}8.3) \times 10^{-3}$ /uc/cc
Reactor Effluent Retention Basins to River	alpha	<30 /uc/sec $<5 \times 10^{-9}$ /uc/cc
I-131 in Farm Wastes to River	I-131	30 /uc/day 5.9×10^{-7} /uc/cc
I-131 in Columbia River-Hanford	I-131	1.7×10^{-7}

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CONTROL UNIT (Continued)

SAMPLE TYPE AND LOCATIONS	Activity Type	Average Activity Density (μc/cc)
Atmospheric Pollution		
Gross Alpha Emitters	alpha	$(<4 \text{ to } 8) \times 10^{-15}$
Gross Dose Rate-Separations Areas	beta-gamma	0.8 to 33 mrads/day
Gross Dose Rate-Residential Areas	beta-gamma	0.3 to 1.2 mrads/day
Filterable Beta-Separations Areas	beta	$(0.05 \text{ to } 1.1) \times 10^{-11}$
I-131 - Separations Areas	I-131	$(0.05 \text{ to } 3.4) \times 10^{-12}$
I-131 - Separations Stacks	I-131	1.9 curies/day
Ruthenium-Separation Stacks	$Ru^{103,106}$	0.9 curie/day
Rare Earths - Separation Stacks	beta-gamma	0.05 curie/day
Active Particles - Wash., Idaho, Ore., Mont.	-	0.006 to 0.05 ptle/m^3
Active Particles - HAPO	-	0.01 to 0.2 ptle/m^3
Tritium (as oxides) - Reactor Stacks	T	0.80 curie/day
Vegetation		μc/g
Environs of Separations Areas	I-131	$(0.6 \text{ to } 1.6) \times 10^{-5}$
Residential Areas	I-131	$<3 \times 10^{-6}$
Eastern Wash. and Oregon	I-131	$<3 \times 10^{-6}$
Non-Volatile Beta Emitters Wash. and Oregon	beta	$(2.7 \text{ to } 7.0) \times 10^{-5}$
Alpha Emitters - Separations Areas	alpha	$(1.2 \text{ to } 2.4) \times 10^{-6}$
Alpha Emitters - 300 Area	alpha	2.1×10^{-7}

Average daily emission of I^{131} in separation plant gaseous effluent was 1.9 curies including a maximum emission of 15 curies at Redox on 4-13. Average daily emission of ruthenium from the Redox stack was 0.9 curie/day including a maximum of 5 curies on March 25.

Significant concentrations of airborne radioactive particles were observed at local and remote locations during the month. Maximum

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concentrations at remote locations were on the order of 200-500 particles per 1000 cubic meters of air with decay studies indicating their origin to be the recent nuclear explosions. The maximum concentration near Redox, 2800 particles/1000 cubic meters of air, was believed to originate from the Redox stack.

Collection of surface samples to determine the distribution of radioactive contamination across the surface of the Columbia River was resumed at Hanford, Richland, and Pasco. Highest activity density of gross beta particle emitters in 107 basin effluent water was observed at 107-H on April 1 to be 0.012 /uc/cc.

Portable instrument surveys within a radius of 12,000 feet south and east of the Redox stack showed ground contamination readings ranging from several hundred c/m to 750 mrads/hr.

Analytical Control Laboratory

Routine and special analyses were carried out as follows:

	Analyses Completed		
Analytical Laboratory	March	April	1954 Total
Sample Type			
Vegetation	1207	1211	5070
Water	2188	2453	8308
Solids	273	286	936
Air Samples	444	575	2040
Uranium (Fluorophotometer)	542	616	2320
Oil Fog (Fluorophotometer)	0	178	178
Special Survey Samples (RMSS)	16	13	61
Special Survey Samples (RMU and RS)	30	50	142
Tritium Oxide (Phillips Petroleum)	-	2	2
Tritium Oxide (Special Samples)	-	322	322
Total	4700	5706	19479

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Analytical Control Laboratory - Continued

Counting Room	Analyses Completed March	April	1954 Total
Beta Particle Measurements (Recounts included)	6308	6365	25377
Alpha Particle Measurements (Recounts included)	2073	2129	8272
Decay Curve Points	2975	6752	20437
Absorption Curve Points	5912	321	1353
Control Points	608	3444	11859
Gamma Ray Spectrometer Scans	61	16	118
Total	17937	19027	67416

Control Services

Calculations were completed to define theoretical activities of Kr^{85} and Xe^{133}, Sr^{89} and Sr^{90} which would be available during the separation process under existing operating conditions. Statistical evaluations were made of data measuring activity density of alpha particle emitters in well water in the Hanford environs during the period 1951 through 1953. An empirical expression was derived to be used to define the activity density patterns found in the Columbia River below the reactors.

Synoptic Meteorology

Forecasts	Number Made	April Percent Reliability
Production	90	83.9
24-hour	60	82.6
Special	128	81.2

The over-all monthly average temperature was 51.4°, 2.4° below normal. Precipitation totalled only 0.07" as compared to a normal of 0.38". The average wind speed (10.3 miles per hour at the 50' level) was about two miles per hour above normal and was the highest average for April in 10 years of record.

RESEARCH AND DEVELOPMENT ACTIVITIES

Experimental Meteorology

The analysis of meteorological data obtained from the Tower was extended to include 1953 to provide a climatology of the annual frequency of

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various wind speed, wind direction, and atmospheric stability combinations. For the three-year period studied to date, the over-all percent of time that a condition of neutral equilibrium existed has remained at approximately 10% each year, there was a continuous increase in the frequency of stable periods at the expense of unstable periods. The annual percentages of stability for 1951, 1952, and 1953 were 39%, 51% and 58%, respectively. Since the maximum ground concentration occurs at increasing distances from the stack as the stability increases, a continuous and invariant stack discharge would have led to proportionately increased average annual concentrations at large distances from the source over the three-year period.

Detection of significant amounts of nitrate ions in the ground water about 2200 feet from reverse well 241-T-361A, the source of the nitrate ions, indicates an average rate of movement of about 20 feet per month for the nine years since wastes were first introduced into the well. The rate has increased from a fraction of that figure at the start of operations to several times that at the present time as the water table gradient steepened beneath the well due to the influence of the effluent swamp.

Adaptation of the method using $Na(C_6H_5)_4B$ as a precipitating agent in the determination of Cs in soil and wastes gave results comparable to those from the silico-wolframic acid and perchloric acid method and with improvement in speed. Contamination, largely Ru, is removed by $HClO_4$.

Industrial Hygiene

The collection efficiency of filtering media for ruthenium as related to the Redox emission problem was continued. Findings to date with all-glass-fiber media indicate that retention of Ru is low. The laboratory and plant study of particle size of ruthenium dioxide commenced.

Additional samples of Pacific test fall-out were analyzed for beta-emitter activity density and were then radioautographed.

A second gross sample of ruthenium particulates was withdrawn from the Redox waste gas system for use by Biology in animal inhalation experiments.

Final analysis was made of samples in the study of radioactive particles emitted with Redox stack gases.

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Methods

The permeability constants of HT gas through Vinylite VU-1940, Neoprene, and Lucite have been measured and found to be 1.7×10^{-11}, 1.9×10^{-11}, and 1.7×10^{-11} moles·cm^{-2}·hr^{-1}·cm·(mm Hg)$^{-1}$ at 298°K. The permeability constant of HT in Vinylite VU-1940 is 0.7 of that reported in the literature for H_2. The permeability constant of HT in Neoprene glove

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Radiological Sciences Department

It was shown that in the limit of zero thickness anthracene scintillators have the same response to beta and gamma rays for equal dose rates. For practical use in survey meters, finite thicknesses are required; the measurements indicate that their use can be made to introduce acceptably small error. Gamma ray energy dependence of these scintillators was acceptable.

A survey of the energy sensitivity of the standard Hanford film badge using the K source, filtered x-rays, and radium was completed. It appeared that for completeness another, slightly higher, energy was needed for the insensitive film.

Instrument Development

The new stack gas sampler for Industrial Hygiene particle studies was completed and laboratory tests were started. A similar sampler, which uses two separate filter tapes, was designed for Manufacturing to enable them to observe the radioactivity of air streams preceding and succeeding certain critical process operations. Design and arrangement of the Ru-I monitor for Redox stack gases were completed.

Data collected in the study of extra-cameral ionization effects in the CP meter indicated that the potential difference between the circuit wires and the aluminum electrostatic shield was responsible, at least in part, for the effects observed. Coating all available surfaces of the shield with colloidal graphite diminished the effect markedly, and this procedure was recommended for existing instruments.

Radio telemetering system development yielded a simple sampling arrangement for translating meteorological and radiation data into audio frequencies proportional to the measured quantities. Modulating the f.m. carrier with such frequencies (f.m. - f.m. operation) provides an optimum signal-to-noise ratio. Land contour profiles were charted to find the relative merits of the Meteorology Tower and Gable Mountain as a location for the Repeater Station. Either site fails to reach three existing wind or radiation stations on line-of-sight transmission.

Wind component meter development yielded a filter arrangement which promises to permit recording the three measured components on a single wire record.

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Radiological Sciences Department

BIOLOGY SECTION

AQUATIC BIOLOGY

Ecology

Survey of the Columbia River

Activity densities of plankton and bottom algae decreased substantially, but for other river organisms remained at approximately the same level as last month.

Selected values of interest were:

Organism	Location	Activity Density (μc/g)	
Salmon fingerlings	Hanford	(Maximum)	10^{-3}
Minnows (Shiners)	Hanford	(Average)	4×10^{-4}
Whitefish flesh	Hanford	(Maximum)	10^{-4}
Midge larvae	McNary Reservoir	(Average)	10^{-4}

Effluent Monitoring

Mortality of salmon fingerlings was slightly higher in 2% area effluent than in the river water control. Chemical toxicity of 3% reactor influent significantly retarded growth.

Temperatures anticipated for the Columbia River at future reactor levels (IX) have not adversely affected fingerling size salmon from local stock.

BIOLOGY CONTROL UNIT

Biological Monitoring

Rodents collected in the vicinity of the Redox plant showed less than one-fifth of the kidney activity density (Ru) observed during March. Thyroid activity densities increased, with a maximum of 0.06 μc of I^{131}/g of tissue occurring one mile SE of Redox.

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Radiological Sciences Department

Clinical Laboratory, Radiochemistry

Routine services increased 15% above average.

Microscopy

The electron microscope facilities were moved to the train shed and are again in operation.

In addition to a series of 114 autoradiographs of plutonium in tissues, autographs of Ru^{103} - Ru^{106} dispersed in mice lungs were prepared.

EXPERIMENTAL ANIMAL FARM

Toxicology of I^{131}

Metabolism of sheep on I^{131}, as evidenced by thyroid radioiodine contents, was about the same as that observed one year ago.

METABOLISM

Plutonium Absorption and Metabolism

To obtain evidence as to whether plutonium absorption from the gastro-intestinal tract is different for large animals, single large doses of solutions of plutonium were administered to the stomachs of 15 rats and three pigs.

In tracing the mechanism of plutonium transport through blood, a technique was developed for separating protein from non-protein in blood sera of quantities as small as 0.05 ml.

Fission Product Absorption and Metabolism

Cesium distribution in rats was studied over a 40-day period. As expected a large fraction of the Cs fed was absorbed and excreted in the urine.

Tritium Absorption and Metabolism

Chlorella cells were grown for 4 to 5 generations in the presence of deuterium and tritium oxides. Then the cells were allowed to grow in nutrient solution containing no tracers initially. By determining changes in the

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solution's content of tritium, it was determined that less than 20% of the tritium which the cells incorporated was relatively active metabolically.

PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS

Particles obtained from the ruthenium oxidation off-gas line and deposited in the lungs of mice disappeared from the lungs very slowly and behaved as insoluble material.

PLANT NUTRITION AND MICROBIOLOGY

RBE by Microbiological Methods

Two experiments were completed, the one comparing sulfur-32 with tritium provided no usable data while that comparing tritium with phosphorus-32 gave RBE values of 2.3 and 2.6.

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FINANCIAL DEPARTMENT MONTHLY REPORT

APRIL, 1954

Preparation of the Budget for the Fiscal Year 1956 and Revision of the Budget for the Fiscal Year 1955 was completed by the end of April and all data relative to production programs was submitted to HAPO management for review. In addition, the following budgets were reviewed during the month and transmitted to the budget office of the Atomic Energy Commission on the dates indicated:

7000 (Community) Program	April 6
7000 Program Alternates II and III	April 7
Equipment Not Budgeted in Construction Projects	April 16
Inventories - Supplemental Request	April 27
Research and Development	April 30

A series of meetings held with AEC personnel to review the Sub-Programs of the Community were attended by Community Management and Budget Division personnel of the AEC and personnel responsible for management of the operating department and sections within General Electric as well as members of the Financial Department. As a result of these meetings, it was agreed that a review of this budget would be made and minor reductions would be recommended to bring the funds requested in line with the Congressional submission.

Considerable assistance was rendered members of the General Accounting Office to facilitate its review of the details and procedures used in preparation of the original Fiscal Year 1954 Budget which was issued in April, 1952.

Preparations were made for a payment to the court in the Lindell, et al v. General Electric Company case in the amount of $112,158 (before payroll deductions for taxes), for retroactive wages to 207 guards for the 30-minute intervals in their shifts designated as lunch periods (such payments covering the employment period from July 28, 1949 to July 27, 1951), together with costs. The judgment included the following items: wages, $86,871; attorneys' fees, $17,500; court costs, $134; and interest, $7,653. Computations were completed for companion case (Connolly and Black v. General Electric Company) which included 186 additional guards and 108 of the guards who were also in the Lindell case, for the period up to September 23, 1951, which is now pending in the Superior Court of the State of Washington.

Preparations were also made for final computations of retroactive overtime premium due firemen on the two-platoon system for hours in excess of 40 per week, in accordance with a ruling of the Court of Appeals for the Ninth Circuit in the case of Porter v. General Electric Company that such employees (who claimed additional pay for the period from March 20, 1950 to February 28, 1951) were engaged in compensable work within the meaning of the Fair Labor Standards Act for the entire time spent at the firehouse, including sleeping time. Calculations remained to be completed for amounts due on similar claims covered in the companion cases of Rivers, et al. v. General Electric Company and Canfield et al v. General Electric Company, for additional men and the period up to April 26, 1954.

Preparations were made to begin current salary payments to firemen on the two-platoon system in accordance with the Porter decision, effective April 26.

Answers and comments were forwarded to the Finance Division of HOO-AEC with respect to comments by HOO-AEC on its audit of General Electric Company payroll procedures.

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During the month of April a substantial effort was directed toward establishing the ppropriations Unit as a substitute for the Appropriations and Budget Committee, which is to be discontinued May 1, 1954. Organization and Policy Guide 05.1, describing the new procedures for plant and equipment appropriations, was issued.

A special study of plant and equipment and depreciation accounting was undertaken during the month. The results are expected to be reported on a preliminary basis by June 15.

The first phase of our property management program has been completed with the inventory of all uninstalled equipment in the plant. The next phase of this program is to reconcile discrepancies between the inventory just completed and old plant records; to standardize descriptive data on equipment; and to furnish the Property Control Units with permanent record cards which will enable management to plan future replacement programs.

The annual physical inventory of essential materials (excluding coal) in the custody of the Manufacturing Department was taken as of April 30.

Two representatives of the General Electric Traveling Auditor's staff in Schenectady arrived on April 19 to commence an audit of various areas of financial operations at HAPO.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 3
Audits and Procedures Section Report	I-4 through I-5
Cost and Budgets Section Report	I-6 through I-8
General and Personnel Accounting Section Report	I-9 through I-17
Property Accounting Section Report	I-18 through I-22
Personnel and Organization Statistics	I-23 through I-24

The report of the SF Accountability Section, not being appropriate for inclusion herein, is covered by classified documents which have been submitted through official channels.

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SUMMARY OF CASH DISBURSEMENTS, RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of $6,900,000 and $6,100,000, respectively, by the Atomic Energy Commission) for the months of April and March, 1954, is shown below:

Disbursements	April	March
Payrolls (net)	$3 200 453	$2 795 409
Materials and Freight	1 851 799	2 390 939
Payroll Taxes	770 949	641 195
Payments to Subcontractors	611 613	907 679
United States Savings Bonds	217 529	184 406
Group Insurance Premium	132 353	132 291
Pension Plan - Employees' Portion	131 447	109 341
Travel Advances to Employees	68 095	82 193
HAPO Stock Bonus Plan Payment for 1953	-0-	207 704
All Other	91 359	258 146
Total	7 075 597	7 709 303
Receipts		
Rent	122 621	129 333
Hospital	71 986	79 251
Group Insurance Refund	50 000	-0-
Electricity	45 792	86 324
Telephone	36 368	53 261
Refund of Travel Advances to Employees	10 975	11 449
Sundry Accounts Receivable	8 833	11 555
Bus Fares	8 119	9 090
Sales to AEC Cost-type Contractors	3 726	12 863
Refunds from Vendors	1 636	8 186
Other	5 455	19 119
Total	365 511	420 431
Net Disbursements	$6 710 086	$7 288 872

Outstanding advances as of April 30, 1954, and March 31, 1954, were as follows:

	April	March
Cash in Bank - Contract Accounts	$2 430 624	$2 200 121
Cash in Bank - Salary Accounts	50 000	50 000
Travel Advance Funds	-0-	40 590
Total	$2 480 624	$2 290 711

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AUDITS AND PROCEDURES SECTION
MONTHLY REPORT - APRIL, 1954

Internal Audit

Reports were issued for the following audits:

Accounts Receivable -- Rent
Accounts Receivable -- Electricity
Accounts Receivable -- Kadlec Hospital
Source and Fissionable Accountability Records -- 300 Area
Plant Library Reference Materials.

The following audit was continued:

Source and Fissionable Accountability Records -- 100 Areas

Reports were being prepared for the following audits:

Work Order Procedures
Cash Controls

Audits were started during the month of April for:

	Date Started
Bank Account Reconciliations	April 1
Deposit Accounts	April 15
General Electric Suggestion Plan	April 15

At the request of the Engineering Department, figures compiled by personnel of the Reactor Projects Sub-Section covering unacceptable graphite under the terms of Special Agreements No. G-5 and G-12 were reviewed and tested preparatory to their use in settlement negotiations with the National Carbon Company.

Five internal auditors have been assigned to work under the supervision of the General Electric traveling auditors now carrying out an audit at HAPO.

Accounting Procedures

Among the projects completed during April were: (1) An outline of a series of IBM reports to present work order information more rapidly and reduce the number of reports required, submitted to the Cost and Budgets Section for review, and (2) the review of a suggested procedure for weighing carload lots of material received in tank and hopper cars which was suggested by the Purchasing and Stores Section and submitted to us for verification that financial requirements are being met. The procedure reduces the number of cars to be weighed and should reduce costs for the Transportation Section.

Three business graduates entered the Financial Department's rotational training program during April, two of them being mid-term graduates from the Universities of Utah and Washington, respectively, and the other a former employee returning after a two-year tour of duty in the Marine Corps.

Administrative Planning

The activities of this group for April were primarily concerned with organization changes rather than operational problems, 33 Organization and Policy Guides being sent to the printing office in April, compared with around 20 for a normal month. Most of the guides dealt with the transfer of functions and responsibilities.

Organization and Policy Guide 05.1 ("Appropriations and Budget Committee") is now in the course of revision, since the committee has been discontinued, and a procedural appendix to that guide is being prepared for issuance by the Manager-Finance. All guides which refer to A and B Committee work, the Work Review Committee, or to the Manager-Administrative Practices, are being revised to conform to the new organizational pattern.

Other activities of the Administrative Planning group for April included the compilation of a new organization directory for transmittal to Schenectady, and a list of HAPO employees holding administrative offices or committee memberships in technical or professional societies. The latter schedule was prepared after sending a questionnaire to all exempt employees and tabulating the returns.

The AEC bulletins received during April included none which required special attention. A monthly summary of AEC transmittals is being prepared for presentation to the Operating and Staff Committee meeting on the second Monday of each month.

Reimbursement Accounting

Aside from normal reports and assignments, a major project in April for this group was the preparation of a "Statement of Factors" for the calendar year 1951, a summary report requested by the Schenectady office for use in connection with a review of General Electric's contracts with the Government under the terms of the Renegotiation Act. The purpose of this statement, prepared in questionnaire form, is to call attention to HAPO's contribution to the defense effort, on which there is no profit. It should be completed early in May.

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COST AND BUDGETS SECTION
MONTHLY REPORT - APRIL, 1954

Consolidations and Budgets Unit

An analysis was made of a report submitted to A.E.C. Procurement by the General Electric Purchasing Unit concerning requirements of certain essential materials as reflected in the current budget submission and a meeting was held with A.E.C. personnel to reconcile the variance in amounts as contained in the two documents.

As a result of the transfer to Manager - Finance of the responsibility for approval of departmental overtime requests, a monthly analysis was initiated to supply the Manager - Finance with the information necessary for such review. The monthly analysis will include such supporting schedules and graphic presentations as are necessary to provide pertinent information relative to trends, relation of actual hours to budgeted hours and cost of overtime worked.

Engineering Cost Unit

Discussions were held during the month with Engineering Department representatives relative to funds that would be required for Research and Development for the balance of this fiscal year. The Engineering Department felt that, in view of both on-site and off-site commitments already made, $366,000 in addition to the amount already authorized for the 2000 Program would be required. It also developed that $42,000 of the amount authorized for the 3000 Program would not be required, making a net total of $324,000 additional funds required for Engineering Research and Development Programs this fiscal year. These additional funds would permit a rate of expenditures 17% above the going rate for March and 35% above the average for the first three quarters of this fiscal year. At the end of the month a letter was being prepared to the Atomic Energy Commission requesting these additional funds and setting forth the work programs which will have to be curtailed or cancelled if funds are not made available.

An inventory of graphite, remaining after fabrication of the requirements for KW and KE, was taken as scheduled during the month. Pricing and extension is expected to be started during May; however, adjustments resulting from possible claims against the supplier due to material which did not meet specifications, sale of equipment furnished the supplier during production of the graphite offset, in part, by supplier's claims due to partial cancellation of certain contracts, will delay final pricing. Assistance is being given daily to the Engineering Department in calculating these claims.

The Atomic Energy Commission has advised that the standard rate applied to construction costs to liquidate North Richland Camp expense has been more than adequate and a refund is being proposed. Assistance is being given to the Atomic Energy Commission in determining the basis for distribution of this refund.

Plans were formulated during the month to establish procedures for commitment accounting for both operating costs and equipment not budgeted in construction

projects. Commitment accounting for equipment is designed to provide the status of all capital equipment costs and commitments of Technical and Design Sections by type of equipment and by Section and Sub-Section. Information relative to amounts expended, amounts committed, requests in transit, and unexpended budget will be reported monthly. In addition to the above reports, closing statements will be issued on each appropriation request showing final cost as compared with authorization. The procedure for operating cost commitments is currently being developed. Establishment of the procedure will be made as soon as possible in order to facilitate making accruals in June as well as getting the system operating smoothly for the coming fiscal year.

Standard liquidation rates for Technical Section were reviewed to determine their adequacy for distribution of prior months' over-under liquidations by June 30, 1954.

General Cost Unit

Several round table meetings were held during April at which emphasis was placed on the following subjects: (1) more comprehensive cost analyses and more prompt issuance of analyses letters to management, (2) preparation of written cost and budget procedures, and (3) development of additional and improved unit measurements and standards, and their presentation in chart form.

As a result of the reorganization in the Financial Department, budgets were recast, cost codes were assigned the newly established sections and units, and other necessary changes and revisions were made.

Accrued liability and undistributed cost accounts for which this unit is responsible were reviewed for the purpose of determining if accruals to date are adequate and disposition of any over or under liquidations.

Manufacturing Cost Unit

A discussion of the functions and responsibilities of the Manufacturing Cost Unit personnel located in the 100 Areas was presented at a meeting of all Manufacturing Cost Unit employees on April 22, 1954. General information on pile operation was incorporated into this discussion as were examples of reactor operating difficulties and their influence on Manufacturing Cost. This discussion was part of a planned program of the Manufacturing Cost Unit to provide employees with a comprehensive knowledge of all phases of manufacturing cost work.

Manufacturing Cost Unit personnel assisted the Inventory Accounting Unit in taking the annual physical inventory of Essential Materials throughout the plant, and a revised essential material unit price list for the Fourth Quarter of FY 1954 was completed and issued during April.

Top Secret Document (XX-1211) titled "Product Unit Cost (Current Basis)" covering the Third Quarter of Fiscal Year 1954 was issued. This report shows in detail the methods used in combining production quantities, conversion factors, SF Material costs, conversion and depreciation costs to determine unit costs for this period.

A comparison of Work in Process Inventory at January 1, 1954 and March 31, 1954 was completed. Price and quantity changes were determined and analyzed. Results of this comparison were issued in Document HW-31667.

The Manufacturing Department Budget for FY 1956 and Revision of Budget for FY 1955 was completed in April and charts of production and cost trends were prepared for each of the major facilities for inclusion in the submission to A.E.C. Budget Exhibit II which is a summary of cost comparisons and budget assumptions was prepared and issued in Document HW-31436. Minor revisions of the equipment budget and inventory budget were made. A revision of the Manufacturing Plant Improvement Project Budget was withheld pending A.E.C. action. Material Consumption as included in the FY 1956 and Revision of FY 1955 Budget was reviewed in detail with the Atomic Energy Commission.

Separations Section portion of the Manufacturing Department Quarterly Progress and Improvement Report was prepared for the Manager of the Separations Section. A revised combined unit cost and standards report for the Separations Section was designed and placed in effect April 1, 1954. The report presents to the first line supervision the actual cost of their process as compared to the standard cost of the process, enabling them to take immediate corrective action on items which appear to be out of line.

The estimate of Manufacturing Cost for FY 1954 made in April was very close to the maximum amount provided in the revised Financial Plan. For this reason, considerable effort was expended in reviewing actual expenditures for nine months and estimated expenditures including year-end adjustments for the last three months. Manufacturing Department management was notified of this situation, and methods of controlling and reducing cost were discussed at Area cost and staff meetings.

Four comparisons of Manufacturing Costs and production quantities were made in April:

1. Standard costs, actual costs and variances for the month of March and Fiscal Year to Date.

2. April forecast for FY 1954 compared with FY 1954 annual forecast prepared in July, 1953.

3. Comparison of March and April forecasts for the six month period of April, 1954 through September, 1954.

4. Comparison of April forecast for First Quarter FY 1955 with Revised Budget, First Quarter FY 1955.

GENERAL AND PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - APRIL, 1954

Narrative Report

General Books Unit

Unexpended advances from the Commission amounted to $2,480,624 at April30, 1954, compared to $2,290,711 at the close of March. Additional advances of $6,850,000 were requested to cover May expenditures and to insure adequate bank balances. May expenditures have been estimated as follows: payrolls, $3,750,000; material and freight, $1,345,000; subcontracts, $514,000; and miscellaneous, $641,000.

Preliminary work was started in analyzing ledger balances and determining necessary year-end accruals. An analysis of the Continuity of Service Expense Accrued account indicated an over-accrual as of December 31, 1953 of approximately $665,000.

Financial statements for Hanford Atomic Products Operations and Atomic Products Division for March were issued April 13 and 19, 1954, respectively; other major financial reports were issued on their scheduled dates.

During April 330 expense reports were booked totaling $53,857, compared with $61,151 booked during March. Unaccounted for advances as of April 30 totaled $91,105 indicating that activity will be heavy during May and June. Thirty-two travel and living expense reports were returned to supervisors during the month for further review and action, and twenty-seven cash advance requests were returned for proper approvals.

Revised estimates of FY 1954 travel and living expense variation were received from department managers. These estimates indicated that, although some departments will overrun their budgets, the aggregate budget of $16,000 appears adequate.

As a result of the recently adopted procedure for booking travel and living expenses, the balance of funds in the Travel Advance Bank Account was closed out and transferred to the Seattle First National Bank Contract Account.

Accounts Payable Unit

Volume of vouchers processed in Accounts Payable during the month remained at a high level. 4,743 vouchers amounting to $3,491,610 were booked which exceeds by 35% the monthly average for calendar year 1953. Based on recent purchasing activity and forecasts, it is estimated that this high volume of vouchers will continue for several months. Purchase Orders received in Accounts Payable numbered 1,700 in February, 2,512 in March, and 2,694 in April.

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Payments to date to National Carbon Company for shipments of graphite under Special Agreements Nos. G-5, G-12, and G-23 aggregate $3,815,081, $3,711,313, and $998,020 respectively. Deliveries of graphite under the agreements have been completed and paid for; the following settlements remain to be accomplished:

1. Settlement of backcharges to be made for graphite delivered under G-5, and G-12, and determined after delivery to be defective.

2. Settlement for cancellation charges under G-12, resulting from the cancellation of all production in excess of approximately 2000 tons.

3. Redetermination of the price of graphite in excess of 1000 tons, delivered under G-23.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 26 and open contract commitments at the end of April amounted to $1,741,404. Payment on these contracts in April totaled $161,573 for work performed during the month. Disbursements relative to requirements contracts for the month amounted to $445,463.

Commitment records maintained on 31 construction projects indicated an open balance at the close of April of $4,639,541.

Accounts Receivable Unit

The gross Accounts Receivable balance at April 30 amounted to $328,648, an increase of $57,685 over the balance at March 31. Details are shown in Statistics portion of this report.

Rental rates on all telephone rental cards were changed, and new accountability controls were established, due to reduction in Federal Excise Tax rates effective April 1, 1954. The excise tax rates on both rental and toll charges were reduced to 10% from the previous 15% tax on telephone rental, and 15 and 25 percent tax on toll charges.

New telephone rental cards were prepared and accountability controls established in April covering an increase in telephone rental rates effective May 1, 1954.

Bi-monthly cycle billing procedures for billing electricity to residential consumers were initiated effective April 1, 1954, and responsibility for preparation of electricity bills was transferred to Accounts Receivable. Commercial consumers will continue to be billed on a monthly basis. The new procedures conform to billing methods of utility companies in the area. Initial billings were issued on April 5, 1954, and charges to all commercial consumers and 10 of the 21 residential routes were billed during April.

The quarterly Accounts Receivable report was issued in April, showing a balance at March 31, 1954, of $270,963. Of this amount $175,381, or 65%, represented

current accounts; $30,869, or 11%, accounts thirty to sixty days old; $8,884, or 3%, accounts sixty to ninety days old; $55,839, or 21%, represented accounts over 90 days old. This latter amount included items totaling $13,804 which we consider uncollectible and have subsequently forwarded to collection agencies. The general ledger balance of $270,963 reflected a decrease of $23,940, or 8%, from the balance at December 31, 1953.

Personnel Accounting Unit

A revised special absenteeism report, based on frequency of absences rather than total days absent, was issued for the first time for the quarter ended March 28, 1954 and was distributed to section managers. Reports were issued with respect to 482 employees.

The revised weekly time card, explained in Office Letter No. 194, was put into use on April 12, 1954. Improved statistical data from IBM equipment will result from the revision.

Representatives of the Auditing Services Department, aided by HAPO Internal Auditors, began an audit of payroll operations during the month.

Reorganizations in the Financial Department and the Transportation Section of the Plant Auxiliary Operations Department were reflected in payroll records during the month. The new organization codes were used in the payroll for the week ended May 2, 1954. The changes involved 66 exempt employees and 628 non-exempt employees.

The Employee Relations Section of the Employee and Public Relations Department was furnished with lists of employees by five-year service groupings for use in establishing the Service Recognition Plan at HAPO.

Participants in the G. E. Savings and Stock Bonus Plan as of December 31, 1953, were given individual statements showing total bonds purchased, total shares of G. E. stock credited, and the amount of accumulated income from the stock. A copy of the G. E. Annual Report for 1953 was included with each statement.

Classification of HAPO employees participating in the G. E. Insurance Plan, by age, sex, and annual earnings, to be used by Metropolitan Life Insurance Company in determining tentative premium rates, was completed and forwarded to Accounting Services Division.

Payroll tax returns for the first quarter of 1954 were completed and forwarded to the Accounting Services Division. State unemployment tax reports covered employment of HAPO employees in 17 states.

The quarterly report of college graduates added, removed or transferred to or from HAPO during the first quarter of 1954 was submitted to Accounting Services Division.

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Final arrangements were made for a payment to the Superior Court on May 3, 1954 of wages and costs aggregating $112,158 (before deductions for payroll taxes) on the Lindell et al v. General Electric Company case. In the companion guards case (Connolly and Black v. General Electric Company), final calculations of amounts due individual plaintiffs were furnished the Legal Department.

Calculations of amounts due plaintiffs in the Porter v. General Electric Company case were substantially completed, but extensive calculations remained to be performed on the companion Community Firemen cases and for work periods not included in the cases. Preparations were made for current payments to Community Firemen in increased amounts, effective April 26, 1954, in accordance with court decisions.

The following revised Organization and Policy Guides covering Employment and Payroll Practices were distributed during the month of April:

O.P.G. No.	Subject
18.1	Weekly Time Cards
18.9	Distribution of Salary Checks, Earnings and Deduction Statements, U. S. Savings Bonds and Custody Receipts.

Request for Reimbursement Authorization was submitted to HOO-AEC to cover a change in wording from "annual base salary rate" to "annual salary rate" as the basis for computing overtime payments to exempt employees.

Round table discussions were held by supervisors with all non-exempt employees during April.

A reply was directed to the Chief, Finance Division, HOO-AEC, concerning comments by AEC on its audit of payroll procedures.

Details of the computation of 1953 future service pension costs of $1,829,049, applicable to HAPO employees, was submitted to HOO-AEC with a request for approval for reimbursement of these costs.

STATISTICS

General Books Unit

	April	March
Cash Advance Account		
Cash Advances - Beginning of Month	$87 842	$79 912
Advances During the Month	68 095	82 530
Expense Accounts Submitted	53 857 Cr.	63 151 Cr.
Cash Refunded	10 975 Cr.	11 449 Cr.
Cash Advances - End of Month	$91 105	$87 842

	April	March
Outstanding Cash Advances		
Current	$81 134	$75 260
Over 30 Days	9 971	12 582
Total	$91 105	$87 842
Travel and Living Expenses		
Actual Expenses	$52 669	$61 031
Billed to Government	48 765	58 026
Balance in Variation Account at End of Month	3 904 Dr.	7 502 Dr.

Accounts Payable Unit

Accounts Payable Balance at Beginning of Month	$ 673 416	$ 610 142
Vouchers Entered During Month	3 491 610	4 700 282
Vouchers Paid During Month	3 657 615 Dr.	4 645 194 Dr.
Cash Receipts	1 636	8 186
Accounts Payable Balance at Close of Month	$ 509 047	$ 673 416
Number of Vouchers Entered	4 743	4 415
Number of Checks Issued	2 901	2 746
Number of Freight Bills Paid	1 407	1 381
Amount of Freight Bills Paid	$327 067	$344 191
Number of Purchase Orders Received	2 694	2 512
Amount of Purchase Orders Received	$1 798 760	$2 442 180

Accounts Receivable Unit

Accounts Receivable at Close of Month		
Hospital	$138 750	$127 049
Sundry	41 642	33 114
Electricity	51 251	28 611
Equipment Sales to Facilities	26 175	26 524
Rent	28 232	25 844
Telephones	31 424	23 742
Cost-Type Contractors	8 916	4 554
Safety Shoes	1 561	807
Loans to Employees	697	718
Sub-Total	328 648	270 963
Reserve for Bad Debts	25 898 Cr.	24 959 Cr.
General Ledger Balance	$302 750	$246 004

1214398

	April	March
Hospital Receivables		
Number Out-Patient Invoices Issued	1 968	2 245
Charges During the Month	$ 87 642	$ 77 711
Collections - Cash	71 986	79 251
- Payroll Deductions	4 887	5 511
Sundry Receivables		
Number of Invoices Issued	241	278
Amount of Invoices Issued	$ 17 274	$ 11 413
Cash Received	8 833	11 555
Electricity Receivables		
Number of Bills Issued	3 863	7 274
Amount of Bills Issued	$ 69 059	$ 84 174
Cash Received	45 792	86 324
Rent Receivables		
Houses		
Number of Houses Occupied	5 959	6 027
New Leases and Lease Modifications	64	46
Lease Cancellations	68	45
Charges During the Month	$306 471	$307 287
Collections - Cash	48 654	53 162
- Payroll Deductions	256 053	256 095
Dormitories		
Number of Rooms Occupied	747	775
New Assignments	65	71
Removals	93	80
Charges During the Month	$ 17 127	$ 17 913
Collections - Cash	5 655	5 830
- Payroll Deductions	12 236	12 428
Facilities		
Number of Facility Leases	165	165
Revenue	$ 68 312	$ 70 342
Telephone Receivables		
Working Telephones (Excludes Official Telephones)	6 315	6 289
Telephone Work Orders Processed	257	289
Charges During the Month	$ 44 637	$ 50 747
Cash Received	36 368	53 261
Cost-Type Contractors Receivables		
Number of Invoices Issued	29	27
Amount of Invoices Issued	$ 8 088	$ 2 635
Cash Received	3 726	12 863

Uncollectible Accounts (Total to Date)	Number	Amount
Accounts Forwarded to Collection Agencies	641	$ 53 027
Accounts Returned as Uncollectible	302	30 531
Collections	212 (a)	8 474 (b)
Balance at Collection Agencies April 30, 1954	160	$ 14 022

(a) Includes 179 accounts collected in full and 33 accounts partially collected

(b) Represents total collections, half of which is remitted to General Electric.

Personnel Accounting Unit

Number of Employees	Total	Monthly Payroll	Weekly Payroll
Changes During Month			
Employees on Payroll at beginning of month	8 595	2 308	6 287
Additions and transfers in	101	5	96
Removals and transfers out	(102)	(11)	(91)
Transfers from weekly to monthly payroll		15	(15)
Transfers from monthly to weekly payroll		(2)	2
Employees on payroll at end of month	8 594	2 315	6 279

	April		March	
Overtime Payments During Month	Number	Amount	Number	Amount
Weekly-Paid Employees	7 046	$109 657-a)	6 965	$136 884
Monthly-Paid Employees	430	34 947	419	45 643
Total	7 476	$144 604	7 384	$182 527

Number of Changes in Salary Rates and Job Classifications	April	March
Temporary changes	101	92
Retroactive changes	4	10
Normal changes	1 138	618
Total	1 243	720

Gross Payroll Paid During Month	April	March
Engineering	$ 839 973	$ 816 401
Manufacturing	1 942 500	1 693 623
Plant Auxiliary Operations	988 180	834 280
Other	780 548	688 801
Total	$4 551 201	$4 033 105

(a-Payments to weekly paid employees are for five week periods.

Employee Benefit Plans	Number Participating April	Number Participating March	Percent Participation April	Percent Participation March
Participation in Benefit Plans at Month End				
Pension Plan	7 909	7 912	97.6%	97.5%
Insurance Plan				
Personal Coverage	8 507	8 508	99.0	99.0
Dependent Coverage	5 920	5 905	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 218	4 110	49.1	47.8
Savings Plan	1 115	1 103	13.0	12.8
Both Plans	4 828	4 719	56.2	54.9

	April	March
Pension Plan		
Number Retired	2	6
Number who became eligible for participation	46	51
Number who applied for participation	44	50
Number who elected not to participate	1	1
Replies not received	1	-
Insurance Plan - Number of Claim Payments		
Employee Life Insurance	4	2
Employee Accident & Health Insurance	491	601
Dependent Accident & Health Insurance	422	526
Total	917	1 129
Good Neighbor Fund		
Number Participating	5 710	5 708
Percent of Participation	66.4%	66.4%
Suggestion Awards		
Number of Awards	43	47
Total amount of Awards	$1 040	$ 785
Preferential Rates		
Number (eliminated) or added	(11)	(12)
Number Currently in Effect	620	631
Number of Military Allowance Payments		
Number	1	2
Number of Payroll Deductions - Other than Taxes		
Barracks Rent	17	18
Dormitory Rent	530	531
Good Neighbor Fund	9 627	11 397
Hospital	638	498
House Rent	5 107	5 116
Insurance	6 272	8 486

Number of Payroll Deductions - Other Than Taxes (Continued)	April	March
Pension	24 300-a)	29 900-a)
Safety Shoes	624	483
Savings Bonds	14 903	17 716
Trailer Space	153	155
Union Dues	1 782	1 720
Other	165	168
Total	64 118	76 188

(a- Approximate number of payroll deductions rounded to nearest hundred.

1214402

MONTHLY REPORT - PROPERTY ACCOUNTING SECTION
APRIL 1954

Summary

The first phase of our property management program has been completed with the inventory of all uninstalled equipment in the plant. The next phase of this program is to reconcile discrepancies between the inventory just completed and old plant records; to standardize descriptive data on equipment; and to furnish the Property Control Units with permanent record cards which will enable management to plan future replacement programs. When the Property Control Unit program is completed, it should insure current and accurate property records, positive plant-wide custodial control of federal property, and information to management as to the equipment on hand.

Depreciation expense amounted to $5,935,000 in April, an increase of $1,201,000 compared with last month, resulting principally from increased separation of uranium.

A special study of plant and equipment and depreciation accounting was undertaken during the month; the results are expected to be reported in two phases.

1. Review of service lives of 100 Area facilities and recommended depreciation changes, if any.

2. Depreciation, classification, capitalization and obsolescence of all facilities at Hanford.

The annual physical inventory of essential materials (excluding coal) in the custody of the Manufacturing Department was taken as of April 30, 1954.

During the month of April, a substantial portion of the total effort was directed toward establishing the Appropriations Unit as a substitute for the Appropriations and Budget Committee, which was discontinued May 1, 1954. Organization and Policy Guide (05.1) describing the new procedures for plant and equipment appropriations was issued.

Property Management Unit

HAPO property management practices governing the control of sensitive types of property, that is, property which lends itself more readily to theft, loss, or personal use due to its attractive nature, have been given special scrutiny. The Commission is especially interested in the controls of these types of items and has expressed their satisfaction with the steps taken by the Company in this control program.

The Manufacturing Department is now preparing a project proposal for the consolidation of the 100 Areas machine shops. This brings to a close one phase of a property management machine tool utilization project, the objective of which was to secure, insofar as practicable, the consolidation of our machine shops and better overall utilization of our machine tools.

1214403

Plant Accounting Unit

Plant and Equipment values reached the following totals in April:

	(In Thousands) ASSET	RESERVE	NET
Completed Plant and Equipment	$719,550	$264,478	$455,072
Construction Work in Progress	29,149	-0-	29,149
Total Costs Recorded (GE Books)	$748,699	$264,478	$484,221
AEC and Other Contractor Costs			
Land and Land Rights	$ 5,239		$ 5,239
Construction Work in Progress	139,669		139,669
Total	$893,607	$264,478	$629,129

Projects for which unitizations were completed in April were:

CA-257 Biophysics Laboratory	$1,552,000
CA-385 Radiometallurgy Laboratory	1,597,000
CA-406 Mechanical Development Building	691,000
Other Miscellaneous Projects	16,000
	$3,856,000

Phase 1 of a special study of plant and equipment and depreciation accounting is scheduled for completion by June 15, 1954, and Phase 2 by the end of the year. Principles and methods employed by chemical and utility companies, requirements of AEC, policy employed at General Electric installations, and the specific requirements of HAPO are being examined in the study.

The transfer of one exempt employee from Internal Audit to Plant Accounting during April increased total personnel to 35, comprising six exempt and 29 non-exempt.

Inventory Accounting Unit

Prior to the taking of the annual physical inventory of essential materials (excluding coal) in the custody of the Manufacturing Department, surveys were made of all storage locations and meetings and conferences were held with custodial personnel in order to formulate procedures, establish time schedules and procure the manpower for taking the physical inventory.

Preparatory work was started in making the arrangements for taking physical inventories of electrical materials in the custody of the Electrical Distribution and Telephone Section and of excess materials and equipment in the custody of the Stores Unit. These inventories are scheduled to be taken respectively on May 20 and June 2. In conjunction with the physical inventory of electrical materials, arrangements are being made to reclassify and transfer those materials currently booked in spare parts inventory to general supplies inventory.

Inventory Accounting Unit (continued)

IBM type inventory tags will be used this year, in lieu of McBee type tags used last year, in the physical counts of general supplies and spare parts inventories in the custody of Stores. A study that was made to determine the feasibility of utilizing IBM equipment in connection with physical inventory work showed that an IBM operation of aligning and accounting for inventory tags, including cost of tags, was more economical than a manual operation. The use of IBM tags this year is the initial step toward the utilization of IBM equipment with respect to physical inventory work.

Review was made of the memorandum received from the AEC entitled "Draft of Revised Financial Reporting Requirements for Excess Property." In general, the proposed revision clarifies the definitions of the various types of excess property and provides for (1) a new report reflecting analyses of excess material and equipment being generated and disposed of by the construction program and (2) revision of certain existing reports on stores and equipment to obtain uniformity in reporting and additional information on excess stores and equipment. Our comments with respect to the memorandum were forwarded to the AEC on April 16.

Following is a summary showing inventory account balances for the months of March and April, 1954, together with the amount of change:

(In Thousands)	Book Balance 3/31/54	Book Balance 4/30/54	Increase (Decrease)
Current Inventories			
General Supplies	$ 824	$ 916	$ 92
Fuel and Lubricants	87	80	(7)
Essential Materials	3,543	3,449	(94)
Total Current Inventories	4,454	4,445	(9)
Special Materials	323	325	2
Spare Parts	2,538	2,538	0
Excess Materials	2,049	1,786	(263)
Total Inventories - Gross	9,364	9,094	(270)
Less: Spare Parts Inventory Reserve	(537)	(521)	(16)
Excess Inventory Reserve	(2,052)	(1,884)	(168)
Total Reserve	(2,589)	(2,405)	(184)
Total Inventories - Net	$ 6,775	$ 6,689	$ (86)
As a Memo:			
Spare Equipment Held in Storage	$ 1,590	$ 1,552	$ (38)
Excess Equipment	2,187	2,077	(110)
Excess Equipment Reserve	(2,150)	(2,053)	(97)

Note: The decrease of $270,000 in value of inventories at April 30, 1954, from that at March 31, 1954, is due principally to off-site shipments of excess materials.

Organization and personnel at April 30, 1954, remained unchanged from that of March 31, 1954. The number of employees on the payroll was 11 (4 exempt and 7 non-exempt.)

1214405

Appropriations Unit

Project proposals, informal requests and appropriation requests which were processed by the Appropriations and Budget Committee and directives issued by the Commission during the month of April are shown in the following list:

CA-187-D-III - Redox Production Facilities, Waste Water Disposal Basin

Revised proposal requesting increase in GE funds from $54,000 to $91,000 approved by AEC April 2.

CA-431-A & B - New Reactor, 105-C Plant

Revised proposal requesting $228,000 additional funds approved by AEC April 6. Total authorized funds are $63,200,000.

CA-434 - New Bio-Assay Laboratory

Proposal requesting $14,000 to procure and install additional equipment approved by AEC April 7. Total authorized funds are $257,000.

CA-512, No. 2 - 100-K Area Facilities - 1706-KE Recirculation Facilities

Proposal requesting $1,530,000 for facilities for experimental study of water at high pressure and high temperature in closed recirculation loops was forwarded to AEC March 25. GE authorized to perform detailed design.

CA-513 - Expansion of 200 Area Facilities - Hot Semiworks Conversion

Proposal requesting an additional $140,000 approved by AEC April 26. Total authorized funds are $61,000,000.

CA-514 - Expansion of 300 Area Production Facilities

Revised proposal requesting increase in funds of $1,085,000 to new total of $5,085,000 was approved by AEC.

CA-533 - Hanford Works Official Telephone Exchange

Revised proposal requesting over-all funds of $480,000 (GE $64,000) approved by the A & B Committee April 26.

CA-555 - New Graphite Hot Shop & Storage Building

Letter dated March 30, D. F. Shaw to P. D. Lee, authorized GE to proceed with study of alternates in lieu of the proposed Graphite Hot Shop. Design of the facility was authorized, it being understood that the most economical of the various alternates considered will constitute the project.

CG-576 - General Improvements to Laboratory Building

Revised proposal requesting $265,000 was approved by the A & B Committee April 12.

Appropriations Unit (continued)

CG-579 - Effluent Water Monitoring Improvements - 100-C Area

Directive dated April 21 authorized $138,000 for improvements in 100-C.

CG-581 - P-10 Development Facilities

Design authorization in the amount of $10,000 was approved by AEC April 5, 1954.

CG-583 and CG-584 - Moisture Monitoring System for Detection of Leaking Process Tubes - 100 Areas

Proposals requesting $352,000 were approved by the A & B Committee April 12.

CG-585 - Oxidizer Off-Gas Treatment, Redox

Proposal requesting $120,000 approved by AEC April 20.

At their April 26 meeting, the Sub-Committee approved informal request for 440 Voltage Sub-Station - 189-D Building in the amount of $16,000.

During the month, the AEC approved the following requests:

IR-173	Air Conditioning - Community House	$5,400
IR-174	Electricity Metering - Richland Domestic Water System	7,500
IR-175	Expansion of Riverside Park - South	6,500

Appropriation requests were approved during the month amounting to $150,000.

1214407

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION
APRIL 1954*

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning	337	336
Additions and transfers in	44**	6
Removals and transfers out	(8)	(5)
Employees at end of month	373	337
Personnel by Unit at Month-End		
General	7	9
Audits and Procedures Section		
Accounting Procedures	1	0
Administrative Planning	2	0
Internal Audit Unit	15	15
Reimbursement Accounting	3	4
	21	19
Cost and Budgets Section		
Consolidations and Budgets Unit	7	5
Engineering Cost Unit		
General	7	7
Design Section Costs	7	7
Project Section Costs	18	16
Technical Section Costs	10	10
General Cost Unit		
General	2	4
Community Operations and Real Estate	7	7
Medical	3	3
Plant Auxiliary Operations	17	17
Radiological Sciences and others	7	7
Manufacturing Cost Unit		
General	8	8
Costs and Budgets	35	34
	128	125
General and Personnel Accounting Section		
General	0	3
Accounts Payable Unit	32	33
Accounts Receivable Unit	23	23
General Books Unit	19	19
Personnel Accounting Unit		
General	2	2
Confidential Payroll Records	7	8
Employee Benefit Plans and Payroll Reports	19	20
IBM Procedures	1	1
Preparation and Employee Records	29	30
	132	139

1214408

	Current Month	Prior Month
Property Accounting Section		
Appropriations Unit	4	0
Inventory Accounting Unit	11	11
Plant Accounting Unit	35	34
Property Management Unit	5	0
	55	45
SF Accountability Section		
Measurements Methods Unit	6	0
Process Flow Unit	2	0
SF Accounting Unit	5	0
SF Records and Reports Unit	14	0
	27	0
Rotational Trainees	3	0
	373	337

* Reorganization of the Department effective April 1 included addition of two new sections and three new units and accounts for main differences in numbers of employees between current and prior months.

** "Transfers in" include:

From Administrative Practices	3
From SF Accountability	27
From General	5
	35

1211609

PLANT PROTECTION SECTION

MONTHLY REPORT - APRIL 1954

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of Month	End of Month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	62	62 (a)		
Security and Patrol	510	500		10 (b)
Fire Protection	138	137		1 (c)
Office Unit (Laundry and Building Services, Clerical, and Records Control)	300	300 (d)		
TOTALS	1,012	1,001		11

NET DECREASE: 11

(a) - Administration Area Maintenance

1 - Transferred in
1 - Transferred out

(b) - Security and Patrol

1 - Rehire
1 - Reactivated
1 - Transferred in
8 - Transferred out
5 - Terminations

(c) - Fire Protection

1 - Termination

(d) - Laundry and Building Services

3 - New Hires
5 - Reactivated
1 - Transferred in
2 - Deactivated
1 - Transferred out
2 - Terminations

Clerical Services

3 - New Hires
2 - Transferred out
3 - Deactivated
2 - Terminations

1211410

FIRE PROTECTION UNIT

Industrial Fires

Department	Area	No. of Fires	Cause	Loss
Manufacturing Separations Section	200-W	1	Inition from cutting torch	None
Manufacturing Reactor Section	100-F	1	Grass and weeds burning	None
Manufacturing Separations Section	100-B	1	Smoking oil clutch on truck	None
Manufacturing Separations Section	200-W	1	Spontaneous ignition of rags in cardboard carton	$44.00
TOTAL FIRES		4	TOTAL LOSS	$44.00

OFFICE UNIT

Laundry and Building Services

200-West Laundry	March	April
Pounds Delivered	230,334	235,788
Pounds Rewashed	11,073	17,054
Total Dry Weight	241,407	252,842
Monitoring Section		
Poppy Check - Pieces	192,364	228,303
Scaler Check - Pieces	300,957	352,703
Total Pieces	493,321	581,006
700 Area Laundry		
Flatwork - Pounds	34,176	35,421
Rough Dry - Pounds	71,754	40,276
Finished - Pounds	2,454	2,725
Total Weight	108,384	78,422
Estimated Pieces	141,983	102,732

Clerical Services

In keeping with the policy of conducting at least two employee communications meetings during the year, Clerical Services Sub-Unit conducted a series of information meetings in the 100, 200 and 700 Areas during the last week in April. Subjects and topics discussed included General Electric Company's progress to date and plans for the future, the incentive fee contract, proposed and announced arganization changes to effect decentralization, employee benefit plans, credit unions, safety, security, absenteeism, service attitude, working conditions, opportunities for advancement and review of accomplishments. A general question and answer period followed each information discussion.

Central Mail and Addressograph

Special assignments consisted of three preparations and mailings for Employee Realtions, the preparation and mailing of cancer pins and pamphlets to all Good Neighbor Fund Members, Organization and Policy Guide distribution, Office Letters, News Digest and The Monogram.

Addressograph work increased during the past period and much of the actual work load increase does not reflect in volume the deluge of store orders which followed the announcement in the Management News Bulletin that a portion of the store orders could be pre-printed by addressograph; the jobs were small in number but each required plate making and all hand work.

Types and Pieces of Mail Handled	April	March
Internal	2,609,761	2,201,375
Postal	95,678	89,455
Special	2,467	2,253
	2,707,906	2,293,083
Total Postage Used	$4,102.67	$3,600.35
Total teletypes handled	3,865	2,437
Total store orders handled	1,065	913

Addressograph	April		March	
Type of List	Number of Runs	Total Copies	Number of Runs	Total Copies
Plant name list	113	158,414	96	114,367
Housing list	18	80,041	22	83,510
Payroll list	9	28,642	8	23,142
Total new plates		2,485		9,382
Total corrected plates		3,132		1,967
		5,617		11,349

1214412

Office Equipment - Furniture

AEC Property Management has requested a coordinated review of FY 54 Office Equipment requirements be made with their field representative. This information is required to efficiently administer AEC Property Management problems.

Some difficulty is being experienced in procuring inventory expense items such as office swivel chairs, stools, small tables etc. Requisitions are screened with other agencies for surplus and when materials are not available from this source; a written justification is requested to cover reason for need, type, standard specifications etc., before purchase order is placed with vendor.

The following is a list of items, by quantity of material handled during the month:

Item	Received by Credit S.O.	Issued	Salvage
Blackboard	0	1	0
Bookcase	1	4	0
Chair	161	195	35
Costumer	3	36	0
Card File	6	5	0
Cabinet	62	67	12
Desk	22	35	1
Table	18	46	0
Miscellaneous	68	210	0
	341	599	48

Stocks are being assembled and committed to fill 100-K project requirements.

A meeting was held with the Administration Area Landlord to discuss coordinating delivery of additional furniture requests with office moves.

Office Machines

One new machine was received during the month.

Seventy-four machines are being prepared for excess. These machines are surplus to requirements and/or uneconomical to repair. A total of 37 machines, (manual typewriters) were excessed during the month.

A net total of 23 machines were deleted from Master IBM run because of duplicate HW numbers, and erroneous HW numbers caused from transpositions. These discrepancies were found by reconciling serial numbers with HW control numbers and Plant Accounts Control records.

Office Machine Repair

The AEC requested that we establish an office machine repair shop in the Blaw-Knox Area. This was accomplished on April 12. The Blaw Knox Company built, and equipped with necessary facilities, a shop in the Blaw Knox Administration building. A Journeyman Office Machine Mechanic was assigned to this shop for a period of not less than six months. Longer duration depends on satisfactory performance of work and the need for a repairman in this location.

Special work was performed by the Instrument maintenance mechanics during the month when they checked faulty signal cable on the instruments that record the water level in Richland's three million gallon reservoir. Cable was found to be shorting to ground in several places and 800 feet of cable was replaced by the Electrical Unit. This is an underground cable.

Central Printing

During the month of April the Central Print Shop was visited by representatives of Minnesota Mining & Manufacturing Company, Multigraph Sales Agency of Spokane, and E. I. du Pont de Nemours & Company. Each representative provided certain technical information which will be beneficial to our plant operation.

The printing of the booklet "Here's Hanford" was completed and special program insert pages were also printed to coincide with visitation of personnel from Stanford University.

New, larger capacity sinks for plate making and film developing were received and are now being installed.

Work Completed	April	March
Orders received	398	376
Orders completed	386	385
Back log	63	65
Copies printed	1,120,223	1,160,276
Negatives masked	1,284	754
Negatives processed	1,323	829
Photo copy prepared	253	137
Litho plates processed	1,288	978

Stenographic Services

Three new stenographers were assigned to the Stenographic Pool in April - all seemingly well qualified employees.

It is still impossible to fill all loan and transfer requests, due to reduced number of personnel in the pool. Twenty-two loan assignments were made during the month; one illness leave of absence was granted, there were two terminations and one transfer.

The work load was consistent throughout the month, and assignments are current at month's end.

Work was performed for seventy-two individuals, against fifty-one cost codes--418 hours of this work required "Q" cleared personnel. "Secret"wire tape recordings were transcribed for Fuel Technology, and it was necessary to assign two people to this work -- one to operate the machine and one to type the transcription.

121414

Breakdown of Hours	April	March
Dictation & Transcription	2.5	8
Machine transcription	102.5	73.5
Letters	37	30.5
Rough Drafts	99.5	28.5
Ditto, Stencils, duplimats & Xerography	374.5	307.5
Miscellaneous	257.5	431
Training Time	237.5	154.5
Meeting Time	10.5	2.5
Unassigned Time	16	16
Absentee Time	18	--
	1,155.5	1,052
Employees on loan to other units	1,184	1,004
	2,339.5	2,056

Area Mail and Duplicating

Duplicating work loads were slightly heavier this month. The number of copies duplicated reflected an increase over that reported for the previous period. The total of orders on hand, however, was less than 50% of the figure reported last month.

Padlocks were obtained and are now being utilized on all Area Mail vehicles in order to provide close Security control over registered delivery mail. Area Mail personnel were given instructions to store these padlocks in combination safes when not in use, to prevent the possibility of loss or tampering.

The 1704-D mail room was completely renovated this month. Mail sorting bins were added, the mailboard was redesigned, and also repainted at this time. These changes were needed in order to handle increasing mail loads at this location.

Duplicating and Mail Statistics	April	March
Orders received	3,346	3,161
Orders completed	3,406	2,975
Orders on hand	53	109
Offset plates	19,349	16,166
Offset Copies	970,585	808,617
Stencils	139	196
Stencil copies	2,075	2,428
Ditto masters	573	550
Ditto copies	12,224	18,007
Verifax masters	2,227	2,750
Verifax copies	5,763	7,120
Zerox plates	1,328	1,196
Internal Mail	539,342	560,845

1214415

Records Control

Quantity of records received, processed and stored:

Employee and Public Relations Department	53	Standard	Storage	Cartons
Engineering Department	119	"	"	"
Financial Department	119	"	"	"
Manufacturing Department	30	"	"	"
Plant Auxiliary Operations Department	120	"	"	"
Radiological Sciences Department	24	"	"	"
Sub--Contractors				
Vitro Corporation	15	"	"	"
TOTAL	480	Standard	Storage	Cartons

Persons provided records service:	920
Cartons of records destroyed:	258
Records cartons issued:	306

Percentage of Records Service Center Vault (exclusive of North Richland) occupied by records is 83.3%.

Requests for file cabinets received:	30
Requests filled:	22
Requests cancelled:	6
Requests pending:	6

Twelve fire proof combination locked cabinets were picked up in exchange for key locked cabinets resulting in a savings of $1,800.00 ($225. cost of combination locked cabinet minus $75.00 cost of key locked cabinet equals $150.00 savings per cabinet exchanged.) Eighteen key locked cabinets were picked up with no exchange and returned to stock for reissue.

Ten "Requests for Authorization for Records Disposal" were submitted to the AEC for approval. Eleven "Evaluations of Records" for disposal were developed and submitted for internal approval.

Uniform filing was established in two offices during the month, a total of 478 offices have installed the filing system to date. Eleven rechecks were made on established files.

ADMINISTRATION AREA MAINTENANCE

AEC-114 New Transportation Facilities: Actual completion 56% as of April 23, against scheduled completion of 62%. Bus loading lanes are poured, majority of wall panels have been poured, and floor slab work is approximately 40% complete. Roof sheeting completed on "A" and "B" units of main building. Subcontractor resumed work moving sand dune and stabilizing area at large.

1219816

CA-434 Bio-Assay Laboratory: Contact Engineer advises contractor expects to complete work approximately June 1, at which time personnel will move from 706 to the new structure.

CA-561 713 Building Alterations: Final design scheduled for completion May 14.

IR-169 Alterations, Warehouse #13, Stores Yard #2: Contractor started work May 4; scheduled completion date June 29.

CA-533 Official Telephone Exchange: Contact Engineer advises contractor due to start work about June 10.

CA-571 703 Basement Alterations, Fifth Wing, North: Informal Requests in process of preparation as substitute for original Project Proposal, which has been recalled.

-- Additional Office Space - Central Stores Warehouse: Project Proposal to convert a portion of Unit "C" to office use is in course of preparation.

A total of eight doors and 114 lineal feet of Hauserman partitioning were installed on seven requests from 700 Area and two requests from 300 Area.

Fourteen office furniture moves were made during the month.

Office space in 722-C is being rearranged for more practical utilization. Work 75% complete.

Sidewalk to connect main walk to parking space south of 703 Building is under construction.

Hutment 712-A is expected to be sold in May and removed prior to end of June.

Trash disposal equipment contract is expected to be let by AEC in May.

General Maintenance

All stair treads in 761-762 Building stairways were replaced with laminated oak. Old treads were badly cupped and cracked from wear.

Carpenter work in connection with excess shipping program required full time services of two men.

Warehouse 67 was reroofed; roofing was double-nailed to withstand strong winds.

Cycle painting work included repainting of inside stairwells and north half of first floor of front wing, 703 Building; six offices; and ceilings in seven additional offices in 703; 760 Building Reproduction Section. Three patient rooms at hospital were also repainted.

DeWalt saw was obtained from AEC Excess and installed in Warehouse 15, for use in connection with Excess Program.

Sign work backlog is current for the first time in many months.

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Twelve fluorescent fixtures were replaced in 703 Building, four in 717-A and two fixtures were relocated in 712 Building. Eight fixtures were installed in the hospital.

Exhaust fans were installed in 723 and 770 Buildings.

Locksmith work included rekeying door locks in 105-B; master-keying 50 padlocks and repairing of two vault combinations; resetting eight locks on master system in 328 Building; and repairing 25 door locks in 325 Building.

Fuel tank was installed and filters and vents completed on Emergency Generator Building adjacent to 784-A.

Fire sprinkler system in fourth wing, 703, was reverse-flushed on April 17, at request of Fire and Safety. Flush water was screened and scaled, and check was made for sand and rust conditions. Sediment accumulation was not considered sufficient to justify flushing the remaining 700 Area systems at this time.

Annual inspection of sprinkler system at Public Health Building and hospital was completed.

Approximately 50% of safety relief valves in 700 Area and all at the hospital were inspected and tested.

Replacement of radiator push nipples in 770 Building (requiring approximately 1,400 nipples) is 70% complete.

Fire hydrants in Stores Excess Yard were inspected and repaired.

Installation of "Far-Air" test rotors in 703 air conditioners was completed.

Steam Operation

Numbers 1 and 3 boilers were in service at the beginning of the month, with numbers 2 and 4 in reserve.

On April 21, No. 2 boiler was placed in service. No. 1 boiler was removed from the line, for annual overhaul. Numbers 2 and 3 boilers remained in service for the balance of the month, with No. 4 in reserve.

The quantity of steam generated at 784 Plant was 0.8% greater than in April 1953.

Maintenance work consisted mainly of numerous detailed refinements, with emphasis on various electrical circuits and components.

Coal consumed: 1,314.95 net tons.

Steam generated:	18,658.5 M. Lbs.
Steam leaving plant:	16,283.8 M. Lbs.
Steam delivered:	14,123.8 M. Lbs.
Total water softened	2,495,900 gallons
Total soft water sent to Kadlec Hospital	50,860 gallons
Total soft water sent to 784 Heating Plant	2,445,040 gallons

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Operations at 1131 Area Heating Plant were normal throughout the month. As in past years, fire was banked during daylight hours of the warm days near the close of the month and the operators assisted the Public Works Unit with irrigation operations.

Operations at Central Stores Heating Plant were normal throughout the month, with the boiler being shut down completely during the period April 17 through April 28. It is now set up on time clock to provide early morning heat five days per week.

SECURITY AND PATROL

Document Report

Number of classified documents unaccounted for as of April 1: 350
(141 of the above 350 documents are chargeable to E. I. du Pont de Nemours & Co.)

Number of classified unaccounted for during April: 31

This unusual number of unaccounted for documents and prints results from a complete self inventory of all document and print holdings, which started April 19, and is now approximately 95% completed. Searches are now being conducted for this unaccounted for material.

Number of classified documents either recovered or downgraded during the month of April: 27
(Nine of the above 27 documents are chargeable to E. I. du Pont de Nemours & Co.)

Twenty-six of the above 27 documents were located and two were downgraded in classification.*

Number of classified documents remaining unaccounted for as of May 1, 1954: 354
(132 of the above 354 documents are chargeable to E. I. du Pont de Nemours & Co.)

*One of the documents which was located at Wilmington was also declassified by the Non-Technical Document Review Board during April, 1954.

The Non-Technical Document Review Board held three meetings during April and reviewed a total of ninety documents. Of this number -

1 was upgraded to "secret",
2 were upgraded to "confidential",
25 had their classification retained,
1 was downgraded to "confidential",
33 were downgraded to "Official Use Only",
22 were declassified,
5 were not within the scope of the Board, and
1 was referred to the Coordinating Organization Director.

Security Education

Six security articles appeared in the Works NEWS during the month.

There were 368 security meetings held and attended by 4,987 employees of the General Electric Company. A representative of the Security and Patrol Unit showed one of the security films at some of these meetings as indicated below:

"The Calculated Risk" was shown at eight meetings, each with an average attendance of fifteen employees.

"The Tallest Shadow" was shown at four meetings, each with an average attendance of 19 employees.

"The Man on the Left" was shown at two meetings, each with an average attendance of 31 employees.

"Fitting 'U' Into Security" was shown at two meetings, each with an average attendance of 26 employees.

"The Case of the Smokeless Chimney" was shown at one security meeting with 19 employees present.

"Words Are Weapons" was shown at one meeting with 16 present.

"Operations Ivy" was also shown at one meeting with 17 present.

The following security posters were posted throughout the plant during April:

450 of the large size with the slogan "Stop Job Talk"
200 of the bus size with the same slogan were posted in the plant busses

Organization and Policy Guide 15.1.2 entitled "Security Orientation and Meetings" was distributed on April 19.

Forty-three employees of the General Electric Company received a "Q" security orientation talk from either a representative of the Security Unit or a Security Patrol supervisor during the month of April.

Statistical Report of Security Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-W	300
Pat Searches	90	90	41	90	0	0	1
Escorts	13	10	18	72	40	30	71
Ambulance runs	8	0	2	4	0	3	9
Passes issued:							
One day temporary	84	13	3	6	0	52	48
Travel	0	0	0	0	0	0	53
Red Tag	170	223	52	47	0	540	118
Telephonic	0	0	0	0	0	0	9
Supervisor's Post Contacts	407	294	275	316	373	916	592
Other Security Patrol Activities (Computed by hours):							300 & 700
Security File Check	176.5	266.5	*209.7	328.4	430	585	1,426
Building Check	366	30		6.5	449	671	744

*In 100-F Area, the Security File Check and Building Check are combined into one figure.

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Arrest Report:

Violation	Number of Violations	Cases Cleared	Fined
peeding	5	5	5

Citation Tickets issued: 5
Warning Teckets issued: 20

Security Patrol Training Activities

137 Security Patrolmen received classroom instruction during the month.
183 Security Patrolmen attended firearms training during the month.

Training courses were as follows:

Safety Class	1/4 hour
Security Class	3/4 hour
Operations Class	1 hour

Security Post Changes

On March 30, the 181 Tower Post, 100-F Area, was discontinued.

The Gas Instrument Tunnel Post was discontinued in 105-KW on April 1.

On April 6, the "X" level post, 105-KW, was discontinued.

General

On April 27, 1954, a memorandum with attached sample was issued entitled "Undocumented Confidential Documents", clarifying certain points in documenting material classified "Confidential-Undocumented".

On April 19, a personal self inventory of all classified documents and prints was started. This inventory if now approximately 95% complete and searches are now being conducted for the unaccounted for material not located in the inventory.

Security Administration Information

Daily badge log entries	2,541
"Q" clearances	55
Formal "P" clearances issued	34
"P" approval clearances issued	40
Category access granted	31
Category access withdrawn	9

April Rephotographing Program

Number of "A" type badges	19
Number of "B" badges	105
Photos for passes	20
Total	144

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HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING APRIL 30, 1954

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
ENGINEERING DEPARTMENT - ADMINISTRATION SUB SECTION							
I. Visitors to this Works							
C. J. Schmidt Knolls Atomic Power Lab. Schenectady, New York	Technical information problems, review of reactor power plant systems, components, and testing methods	C. G. Stevenson	4-19-54	4-23-54	X		100-B 105-C 105-KE 105-KW 200-W Redox 300 303
II. Visits to other Installations							
C. G. Stevenson to: Battelle Memorial Inst. Columbus, Ohio	Attend meeting of AEC Technical Information Panel	H. W. Russell	4-29-54	4-30-54	X		
ENGINEERING DEPARTMENT - TECHNICAL SECTION							
I. Visitors to this Works							
W. G. Baxter Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss hot metallurgy problems and radio chemistry	L. D. Turner A. H .Bushey	4-1-54	4-2-54	X		200-W Redox 300-L 303
T. Brill Argonne National Laboratory Lemont, Illinois	Information on tri-partite instrument conference at Harwell and control systems and slug failures	R. L. Dickeman	4-5-54	4-5-54	X		100-B 105-C 100-H 105 300-L XXX
W. M. Cashin Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element, physical metallurgy and fuels research units	A. G. Blasewitz J. C. L. Chatten	4-5-54	4-7-54	X		100-B 105-B, 105-C 100-D 105, 189 200-E XXX 200-W XXX 300 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass	Areas
G. R. Caskey, Jr. E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Metal testing discussions	V. R. Cooper E. C. Wood	4-27-54	4-29-54	X	100-D 189-B	
H. B. Coats Blaw Knox Corporation Idaho Falls, Idaho	Technical information in connection with ICPP expansion	F. W. Woodfield	4-15-54	4-16-54	X	200-W 300-L	221-U, Redox XXX
J. W. Croach, Jr. E. I. du Pont de Nemours & Co. Svannah River Plant Augusta, Georgia	Metal testing discussions	V. R. Cooper E. C. Wood	4-27-54	4-29-54	X	100-D 189-D	
W. D. Davis Knolls Atomic Power Lab. Schenectady, New York	Consultation on hydrogen in uranium problems	E. A. Eschbach L. D. Turner	4-27-54	4-28-54	X	100-B 100-D 100-F 100-H 300 700	105-B, 105-C 105, 189 XXX XXX 303
J. R. Feldmeier Westinghouse Atomic Power Pittsburgh, Pennsylvania	Measurement of temperature coefficient of pile loading	R. L. Dickeman	4-9-54	4-9-54	X	100-B 100-D 300-L	105-C 105 303
A. N. Holden Knolls Atomic Power Lab. Schenectady, New York	Discussions on physical metallurgy and fuel element, and fuels research units	A. G. Blasewitz J. C. L. Chatten	4-5-54	4-7-54	X	100-B 100-D 200-E 200-W 300	105-B, 105-C 105, 189 XXX XXX 303
H. K. Jackson Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss equipment performance in Redox and metal recovery plants	V. R. Cooper O. F. Hill	4-7-54	4-9-54	X	200-W 300-L	Redox XXX
E. A. Luebke Knolls Atomic Power Lab. Schenectady, New York	Discuss plutonium handling facilities	V. R. Cooper F. W. Albaugh	4-27-54	4-28-54	X	200-E 200-W	XXX Redox

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass. Areas
J. C. Lynch E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Metal testing discussions	V. R. Cooper E. C. Wood	4-27-54	4-29-54	X	100-D 189-D
G. F. Mechlin Westinghouse Atomic Power Pittsburgh, Pennsylvania	Measurement of temperature coefficient of pile loading	R. L. Dickeman	4-9-54	4-9-54	X	100-B 105-C 100-D 105 300-L 303
E. W. Rebol Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss hot metallurgy problems and radio chemistry	L. D. Turner A. H. Bushey	4-1-54	4-2-54	X	200-W Redox 300-L 303
W. L. Robb Knolls Atomic Power Lab. Schenectady, New York	Consultation on P-10 process	J. C. L. Chatten V. R. Cooper	4-6-54	4-7-54	X	100-B 108 300-L XXX
O. N. Salmon Knolls Atomic Power Lab. Schenectady, New York	Consultation on P-10 process	J. C. L. Chatten V. R. Cooper	4-6-54	4-7-54	X	100-B 108 300-L XXX
H. Schnieder U. S. Atomic Energy Comm. Idaho Falls, Idaho	Technical data relative to CPM program at Arco	F. W. Woodfield	4-14-54	4-15-54	X	200-W Redox, 221-U 300-L XXX
J. W. Ullman Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss equipment performance in Redox and metal recovery plants	V. R. Cooper O. F. Hill	4-7-54	4-9-54	X	200-W Redox 300-L XXX
G. W. Watt University of Texas Austin, Texas	Consultation on separations technical problems	O. H. Greager	4-26-54	4-30-54	X	200-E 221-B 200-W 221-T, 231, Redox, 221-U, 234, 235 300-L XXX
J. L. Zambrow Sylvania Electric Products Bayside, New York	Inspect Sylvania material and see results of tests	E. A. Eschbach	4-12-54	4-12-54	X	100-B 105-B, 105-C 300 303 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
II. Visits to other Installations							
J. A. Ayres to: Knolls Atomic Power Lab. Schenectady, New York	Discuss design of pilot plant	D. W. White	4-7-54	4-8-54	X		
J. A. Ayres to: Battelle Memorial Inst. Columbus, Ohio	Discuss design of pilot plant	C. L. Faust	4-13-54	4-15-54	X		
G. B. Barton to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss separations chemistry	F. L. Culler	4-5-54	4-7-54	X		
G. B. Barton to: Argonne National Lab. Lemont,Illinois	Discuss separations chemistry	S. Lawroski	4-7-54	4-9-54	X		
R. W. Benoliel to: Argonne National Lab. Lemont, Illinois	Discuss uranium metallurgy and attend Argonne Metallurgy Information Meeting	J. M. Simmons	4-19-54	4-23-54	X		
A. G. Blasewitz to: Argonne National Lab. Lemont, Illinois	Attend Argonne Metallurgy Information meeting	J. M. Simmons	4-19-54	4-21-54	X		
A. G. Blasewitz to: Mass. Institute Tech. Cambridge, Massachusetts	Fuel element development discussion	A. R. Kaufman	4-22-54	4-26-54	X		
A. G. Blasewitz to: Sylvia Elec. Products New York, New York	Fuel element development discussion	H. H. Hausner	4-22-54	4-26-54	X		
A. G. Blasewitz to: Armour Research Foundation Chicago, Illinois	Fuel element development discussion	J. A. Stavrolakis	4-22-54	4-26-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
L. P. Bupp to: Feed Material Production Center National Lead Company Fernald, Ohio	Inspect and discuss facilities concerning fabrication for Hanford product	F. L. Cuthbert	4-26-54	4-27-54	X		
L. P. Bupp to: E. I. du Pont de Nemours Savannah River Operations Augusta, Georgia	Discuss reactor operation and control	C. W. J. Wende A. A. Johnson	4-28-54	4-30-54	X		
R. E. Burns to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss separations chemistry	F. L. Culler	4-5-54	4-7-54	X		
R. E. Burns to: E. I. du Pont de Nemours Savannah River Operations Augusta, Georgia	Discuss separations and waste treatment problems	R. B. Fenninger	4-8-54	4-9-54	X		
J. J. Cadwell to: Argonne National Lab. Lemont, Illinois	Attend Argonne Metallurgy Information meeting	J. M. Simmons	4-19-54	4-21-54	X		
J. J. Cadwell to: Feed Material Production Center National Lead Company Fernald, Ohio	Metallurgy consultation	G. W. Wunder	4-22-54	4-22-54	X		
J. J. Cadwell to: Argonne National Lab. Lemont, Illinois	Attend SEC metallurgical conference	J. M. Simmons	4-22-54	4-23-54	X		
J. J. Cadwell to: Aircraft Nuclear Propulsion Project Cincinnati, Ohio	Metallurgy consultation	A. Foche	4-23-54	4-23-54	X		
G. S. Cochrane to: Bridgeport Brass Co. Bridgeport, Connecticut	Discuss equipment for pilot plant	R. S. French	4-9-54	4-16-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
G. S. Cochrane to: Mass. Institute Tech. Cambridge, Massachusetts	Discuss swaging equipment	W. Taynton	4-15-54	4-16-54	X		
W. V. Cummings, Jr. to: Argonne National Lab. Lemont, Illinois	Attend Argonne Metallurgy Information Meeting	J. M. Simmons	4-19-54	4-21-54	X		
R. E. Falkoski to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Mint isotopic enrichment facilities relative to "Mint" Program	M. Roy	4-6-54	5-25-54	X		
C. L. Frederick to: Electro-Circuits, Inc. Los Angeles, California	Evaluate vendor's equipment in conjunction with processing Hanford materials	[illegible]	4-29-54	4-30-54	X		
E. P. Galbraith to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss analytical thorex methods	M. T. Kelley	4-5-54	4-6-54	X		
E. P. Galbraith to: Ames Laboratory Ames, Iowa	Discuss analytical procedures for thorium and zirconium	C. V. Banks	4-7-54	4-8-54	X		
K. M. Harmon to: Oak Ridge National Lab. Oak Ridge, Tennessee	Consultation on plutonium recovery operations	W. H. Lewis	4-5-54	4-16-54	X		
H. H. Hopkins, Jr. to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss separations chemistry	F. L. Culler	4-5-54	4-7-54	X		
H. H. Hopkins, Jr. to: Argonne National Lab. Lemont, Illinois	Discuss separations chemistry	S. Lawroski	4-7-54	4-9-54	X		
R.E. Hueschen to: Argonne National Lab. Lemont, Illinois	Attend Argonne Metallurgy Information Meeting	J. M. Simmons	4-19-54	4-21-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass	Areas
W. T. Kattner to: U. S. Atomic Energy Comm. New York, New York	Metal fabrication discussion	A. Noto	4-27-54	4-28-54	X		
R. E. McGrath to: Feed Material Production Center National Lead Company Fernald, Ohio	Inspect and discuss facilities concerning fabrication for Hanford product	F. L. Cuthbert	4-26-54	4-27-54	X		
R. E. McGrath to: E. I. du Pont de Nemours Savannah River Operations Augusta, Georgia	Discuss reactor operation and control	C. W. J. Wende A. A. Johnson	4-28-54	4-30-54	X		
D. C. Pound to: Oak Ridge National Lab, Oak Ridge, Tennessee	Discuss automatic control systems in operation	J. A. Cox T. E. Cole	4-26-54	4-27-54	X		
D. C. Pound to: Westinhouse Atomic Power Pittsburgh, Pennsylvania	Discuss rate of rise trip systems, procurement of ion chambers for sub-critical monitoring	M. A. Schulz	4-28-54	4-28-54	X		
D. C. Pound to: General Eng. Lab. Schenectady, New York	Discuss development of special ion chambers for Hanford	W. W. Schultz	4-29-54	4-29-54	X		
D. C. Pound to: Knolls Atomic Power Lab. Schenectady, New York	Review KAPL techniques in safety instrumentation	E. J. Wade	4-30-54	4-30-54	X		
P. H. Reinker to: Feed Material Production Center National Lead Company Fernald, Ohio	Inspect and discuss facilities concerning fabrication for Hanford product	F. L. Cuthbert	4-26-54	4-27-54			
P. H. Reinker to: E. I. du Pont de Nemours Savannah River Operations Augusta, Georgia	Discuss reactor operation and control	C. W. J. Wende	4-28-54	4-30-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. B. Richards to: Feed Material Production Center National Lead Company Fernald, Ohio	Inspect and discuss facilities concerning fabrication for Hanford product	F. L. Cuthbert	4-26-54	4-27-54	X		
R. B. Richards to: E.I. du Pont de Nemours Savannah River Operations Augusta, Georgia	Discuss reactor operation and control	C. W. J. Wende A. A. Johnson	4-28-54	4-30-54	X		
J. W. Riches to: Argonne National Lab. Lemont, Illinois	Attend Metallurgy Information Meeting	J. M. Simmons	4-19-54	4-21-54	X		
J. W. Riches to: Bridgeport Brass Co. Adrian, Michigan	Consultation on uranium metallurgy	R. S. French	4-22-54	9-23-54	X		
J. W. Riches to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Consultation on uranium metallurgy	W. M. Leaders	4-23-54	9-23-54	X		
J. W. Riches to: Feed Material Production Center National Lead Company Fernald, Ohio	Consultation on uranium metallurgy	J. M. Ciborski	4-23-54	9-23-54	X		
J. W. Riches to: Ames Laboratory Ames, Iowa	Consultation on uranium metallurgy	F. H. Spedding	4-23-54	9-23-54	X		
J. W. Riches to: U. S. Atomic Energy Comm. New York, New York	Metal fabrication discussions	A. Hoto	4-27-54	4-28-54	X		
W. C. Riley to: Battelle Memorial Inst. Columbus, Ohio	Conference on graphite development	H. Z. Schofield J. A. Slyh	4-28-54	4-30-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
M. J. Sanderson to: Argonne National Lab. Lemont, Illinois	Attend Argonne Metallurgy Meeting	J. M. Simmons	4-19-54	4-21-54	X		
M. J. Sanderson to: Feed Material Production Center National Lead Company Fernald, Ohio	Metallurgy consultation	G. W. Wunder	4-22-54	4-22-54	X		
M. J. Sanderson to: Argonne National Lab. Lemont, Illinois	Metallurgy consultation	J. M. Simmons	4-22-54	4-23-54	X		
M. J. Sanderson to: Aircraft Nuclear Propulsion Project Cincinnati, Ohio	Metallurgy consultation	A. Foche	4-23-54	4-23-54	X		
M. J. Sanderson to: Feed Material Production Center National Lead Company Fernald, Ohio	Metal quality conference	J. M. Ciborski	4-26-54	4-28-54	X		
O. C. Schroeder to: Feed Material Production Center National Lead Company Fernald, Ohio	Inspect and discuss facilities concerning fabrication for Hanford product	F. L. Cuthbert	4-26-54	4-27-54	X		
O. C. Schroeder to: E. I. du Pont de Nemours Savannah River Operations Augusta, Georgia	Discuss reactor operation and control	C. W. J. Wende	4-28-54	4-30-54	X		
D. F. Snoeberger to: Feed Material Production Center National Lead Company Fernald, Ohio	Attend thorium working committee meeting	T. C. Runion	4-28-54	5-3-54	X		
J. R. Townsend to: National Bureau of Standards Washington, D. C.	Obtain thermal conductivity standards	H. E. Robinson E. J. Prossen	4-27-54	5-1-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
E. C. Wood to: Argonne National Lab. Chicago, Illinois	Attend AEC Metallurgical Information meeting	F. Foote	4-19-54	4-21-54	X		
E. C. Wood to: Ames Laboratory Ames, Iowa	Discussion on testing	F. H. Spedding	4-22-54	4-23-54	X		
D. C. Worlton to: Electro-Circuits, Inc. Los Angeles, California	Evaluate vendor's equipment in conjunction with processing Hanford Material	D. E. Erdman	4-29-54	4-30-54	X		
ENGINEERING DEPARTMENT - DESIGN SECTION							
I. Visits to other Installations							
E. L. Armstrong to: Argonne National Lab. Lemont, Illinois	Discuss new reactor development program	L. Coch	4-19-54	4-21-54	X		
E. L. Armstrong to: Knolls Atomic Power Lab. Schenectady, New York	Discuss new reactor development program	T. Snyder	4-21-54	4-23-54	X		
C. A. Pursel to: Argonne National Lab. Lemont, Illinois	Discuss new reactor development program	L. Coch	4-19-54	4-21-54	X		
C. A. Pursel to: Knolls Atomic Power Lab. Schenectady, New York	Discuss new reactor development program	T. Snyder	4-21-54	4-23-54	X		
ENGINEERING DEPARTMENT - PROJECT SECTION							
I. Visits to other Installations							
W. B. Webster to: Vitro Corporation of America New York, New York	Separations plant engineering consultation	S. Stoller	4-19-54	4-21-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. B. Webster to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Separations plant engineering consultation	P. Selak	4-21-54	4-23-54	X		
W. B. Webster to: Knolls Atomic Power Lab. Schenectady, New York	Separations plant engineering consultation	J. Leslie	4-21-54 4-26-54	4-21-54 4-27-54	X X		
W. B. Webster to: Argonne National Lab. Lemont, Illinois	Separations plant engineering consultation	D. R. Shoults	4-26-54	4-27-54	X		
I. M. Jacobs to: Argonne National Lab. Lemont, Illinois	Discuss pile safety and control instrumentation	J. M. Harrer	4-28-54	4-30-54	X		

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

I. Visitors to this Works

L. L. Ferguson General Electric Company New York, New York	Consultation on HAPO salary plan and position evaluations	C. H. Gross W. I. Patnode	4-12-54	4-18-54	X	300-XXX 700	
D. F. Wilcock General Engineering Lab. Schenectady, New York	Undertake engineering service duties for Hanford	D. W. McLenegan	4-19-54	4-23-54	X	100-H 105 200-W Redox 300 XXX	

II. Visits to other Installations

G. L. Brown, Jr. to: Battelle Memorial Inst. Columbus, Ohio	Attend AEC Industrial Information Committee Meeting	N. H. Jacobson	4-27-54	4-28-54	X		
K. V. Stave to: Cambridge Corporation Denver, Colorado	Recruit technical personnel available for employment	D. M. Butler	4-29-54	4-30-54		X	

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Arrival	Departure	Restricted Data Class.	Unclass.	Areas
4-12-54	8-1-54	X		
4-12-54	8-1-54	X		
4-27-54	4-29-54	X	100-B	105-B, 105-C
			100-D	105
			100-F	105
			100-H	105
			300	303;700
4-27-54	4-29-54	X	100-B	105-B, 105-C
			100-D	105
			100-F	105
			100-H	105
			300	303; 700
4-27-54	4-29-54	X	200-W	221-T, 231, Redox, 221-U 234, 235
			300	303; 700
4-27-54	4-29-54	X	200-W	221-T, 231, Redox, 221-U 234, 235

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass. Areas
R. M. Larson E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss operation problems on ventilation and contamination control	C. A. Priode	4-27-54	4-29-54	X	200-W 221-T, 231, Redox, 221-U 234, 235 300 303; 700
J. C. Lynch E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Inspect metallurgical test equipment	C. A. Priode E. C. Wood	4-27-54	4-30-54	X	100-B 105-B, 105-C 100-D 105 100-F 105 100-H 105 300 303; 700
II. Visits to other Installations						
R. C. Aungst to: Argonne National Lab. Lemont, Illinois	Attend Metallurgy Information Meeting	J. M. Simmons	4-19-54	4-21-54	X	
F. A. Hollenbach to: Vitro Corporation of America New York, New York	Design consultation	J. C. Tourek	4-19-54	4-23-54	X	
F. A. Hollenbach to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Design consultation	J. K. Lower	4-19-54	4-23-54	X	
A. R. Keene to: Carbide & Carbon Co. Oak Ridge, Tennessee	Information relative to radiation protection practices	K. Z. Morgan	4-26-54	4-28-54	X	
A. R. Keene to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on radiation protection policies and practices	C. M. Patterson	4-27-54	4-30-54	X	
P. C. Jerman to: Carbide & Carbon Co. Oak Ridge, Tennessee	Information relative to radiation protection practices	K. Z. Morgan	4-26-54	4-28-54	X	
P. C. Jerman to: E. I. du Pont de Nemours Savannah River Plant	Consultation on radiation protection policies and practices	C. M. Patterson	4-27-54	4-30-54	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
F. A. R. Stainken to: General Engineering Lab. Schenectady, New York	Discuss reactor engineering and power problems	G. H. Hupman	4-14-54	4-15-54	X		
F. A. R. Stainken to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor engineering and power problems	E. P. Lee	4-16-54	4-17-54	X		
R. E. McGrath to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Consultation on mutual reactor problems	D. R. Shoultz	4-26-54	4-27-54	X		
O. C. Schroeder to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Consultation on mutual reactor problems	D. R. Shoultz	4-26-54	4-27-54	X		
Ja-28 PLANT AUXILIARY OPERATIONS DEPARTMENT - PLANT PROTECTION SECTION							
I. Visits to other Installations							
T. B. Farley to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Security discussion on plant protective measures	G. F. Hamby	4-7-54	4-8-54	X		
T. B. Farley to: Knolls Atomic Power Lab. Schenectady, New York	Plant protective measures and document control measures	W. R. Cooke Alice Denton	4-8-54	4-9-54	X		
M. J. Headley to: E. I. du Pont de Nemours Wilmington, Delaware	Review retired Hanford classified material for unaccounted for documents	F. M. Burns	4-12-54	5-14-54	X		
R. E. Jaynes to: Telefilm, Inc. Los Angeles, California	Courier and process pieces for processing	J. A. Thomas	4-28-54	4-30-54	X		
R. E. Jaynes to: Electro-Circuits, Inc. Pasadena, California	Courier and process pieces for processing	D. C. Erdman	4-29-54	4-30-54	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
T. B. Pugh to: E. I. du Pont de Nemours Wilmington, Delaware	Discuss unaccounted for documents in retired records	F. M. Burns	4-7-54	4-8-54	X		
T. B. Pugh to: Knolls Atomic Power Lab. Schenectady, New York	Plant protective measures and document control measures	W. R. Cooke Alice Denton	4-8-54	4-9-54	X		
J. E. Smith to: E. I. du Pont de Nemours Wilmington, Delaware	Review retired Hanford classified material for unaccounted for documents	F. M. Burns	4-12-54	5-14-54	X		
PLANT AUXILIARY OPERATIONS DEPARTMENT - OPERATIONS ANALYSIS SECTION							
I. Visitors to this Works							
D. K. Hess U. S. Atomic Energy Comm. Washington, D. C.	View models and visual aid work	B. E. Leslie	4-14-54	4-15-54	X	700	
RADIOLOGICAL SCIENCES DEPARTMENT							
I. Visits to other Installations							
F. P. Hungate to: Mound Laboratory Miamisburg, Ohio	Obtain information on techniques of using polonium and its availability	D. S. Anthony	4-22-54	4-22-54	X		
R. W. Wager to: Chem. Corp. Biological Lab. Camp Dietrich, Fredrick, Maryland	Large animal research and aerosal studies	W. H. Lee	4-15-54	4-17-54	X		
R. W. Wager to: University of Rochester Rochester, New York	Discuss current mutual biological investigations	H. A. Blair	4-19-54	4-20-54	X		
ENGINEERING DEPARTMENT - TECHNICAL SECTION (cont'd)							

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class	Restricted Data Unclass	Areas
R. H. Moore to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss uranium tri-oxide reactivity	S. J. Katz	4-28-54	4-28-54	X		
R. H. Moore to: National Lead Company Fernald, Ohio	Attend Thorium Metal Working Committee Meeting	T. C. Runion	4-29-54	4-30-54	X		
P. J. Pankaskie to: United States Bureau of Mines Albany, Oregon	Consultation on metallurgy and hot water corrosion of zirconium	E. T. Hayes	4-5-54	4-6-54	X		
R. W. McKee to: Oak Ridge National Lab. Oak Ridge, Tennessee	Consultation on plutonium recovery operations	W. H. Lewis	4-5-54	4-16-54	X		
W. H. Reas to: Oak Ridge National Lab. Oak Ridge, Tennessee	Consultation on plutonium recovery operations	W. H. Lewis	4-5-54	4-16-543	X		
ENGINEERING DEPARTMENT - DESIGN SECTION (cont'd)							
A. J. Karnie to: Idaho Chemical Processing Plant Idaho Falls, Idaho	Confer on facilities and methods needed for "J" slug shipping and handling	A. C. Johnson J. B. Phillipson U. L. Ginkle	4-1-54	4-2-54	X		
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT (cont'd)							
D. W. McLenegan to: U. S. Naval Ornance Testing Station Inyokern (China Lake), California	Interview technical personnel	P. A. Longwell	4-7-54	4-9-54	X		
W. D. Norwood to: Argonne National Lab. Lemont, Illinois	Attend Industrial Med. Association Meeting	Dr. Bugher	4-26-54	4-29-54	X		
W. D. Norwood to: U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Exchange health information	Dr. Bradford	5-3-54	5-5-54	X		

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PURCHASING AND STORES SECTION
PLANT AUXILIARY OPERATIONS DEPARTMENT
SUMMARY APRIL 1954

STATISTICAL AND GENERAL

Successful negotiations were completed with the rail carriers for a reduction in the freight rate on Liquid Aluminum Sulphate, to move in tank cars from Portland, Oregon. The savings in freight charges on the current order will amount to approximately $11,500.00.

Through securing bids on an FOB Shipping Point basis from suppliers of Tributyl Phosphate and by shipping in larger quantities with a changed freight classification description a lower delivered cost resulted which will save approximately $3500 for the next year.

Purchase orders for controlled materials in excess of forecasts submitted in January 1954 necessitated application to the Commission for supplemental allotments. A review of field forecasts was requested to bring our forecasts in line with actual requirements.

The change in programming in the P-10 program required the cancellation of a number of orders with the Aluminum Company for special aluminum wafers. Cancellation charges have been submitted by Aluminum Company and alterations to the order are in process.

Forecasts for Steam Coal covering our requirements for fiscal year 1955 have been received from the consuming departments, and the draft for the request for quotation has been submitted to the Commission for approval. It is anticipated that awards will be made prior to June 1, which will allow sufficient time for the negotiation of contracts before the end of the fiscal year.

Conditions causing back orders are being studied closely and action taken has reduced them from a high of 2028 in January to 1091 for the week ending April 30, 1954.

Receiving volume is very heavy and has increased rapidly during the last thirty days. Total shipments for week ending March 19, 1954 were 1354 while total shipments for week ending April 23, 1954 were 1721. Continued heavy procurement in April will tend to further increase the receiving load in May.

Work on the Standard Stock Numbering System is progressing satisfactorily. The basic work is mostly complete and preparation of catalogs will start in May.

Except for a few minor details the 18 month old SAR program to establish departmental responsibility for Spare Parts items is complete.

During April material and equipment valued at $75,915 were withdrawn from Excess Accounts for use on the Plant.

On April 19th, 52 requisitions were received from Minor Construction covering various items of construction material with the required delivery date of April 26th and April 28th. In order to place these orders and have delivery as required, it was necessary for the Buyers to work a 10 hour day during the week of April 19th.

Organization and Personnel	3-31-54	4-30-54	Change
Employees on Roll	274	278	+ 4

1214438

PURCHASING AND STORES SECTION
ADMINISTRATION UNIT
APRIL 1954

The following table shows the net dollar value of business, by cost category, and the number of procurement actions placed with different types of vendors.

April 1954 Cost Category	Government Agency	Small Business	Big Business	Educational and Other
$0 - $ 24.99	$ 43.00	$ 4,666.01	$ 2,576.22	$ -
$25 - $ 499.99	215.75	170,347.24	70,744.10	85.50
$500 - $ 24,999.00	1,039.65	498,717.79	496,025.43	-
$25,000 - $ Up	-	166,373.00	513,014.00	-
	$ 1,298.40	$840,104.04	$ 1,082,359.75	$ 85.50
Number of Actions	7	1868	939	2

Vendors Contacts	254
Damage Reports Processed	7
Over & Short Reports Processed	2
Accounts Payable Requests Handled	345
Difference Slips Processed	70
Clearance Slips & Purchase Order Change Approvals	327
Material Exception Reports	302
Return Orders Issued	202
Claims Processed	5

Shown below is a summary of the net value of procurement actions placed with vendors for manufactured or shelf items in the states of Washington, Oregon, Idaho and Other Areas.

State	Manufactured	Shelf	Total
Washington	$ 836,427.40	$ 239,850.77	$ 1,076,278.17
Oregon	148,562.54	89,146.70	237,709.24
Idaho	-	1,679.09	1,679.09
Other	455,443.76	152,737.43	608,181.19
Total	$ 1,440,433.70	$ 483,413.99	$ 1,923,847.69

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PURCHASING AND STORES SECTION
ADMINISTRATION UNIT

	G	D	TOTAL
Requisitions on hand 4-1-54			
Operations Procurement	961	0	961
Construction Procurement	0	189	189
A.E.C. Procurement	280	48	328
Total	1241	237	1478
Requisitions Assigned during April			
Operations Procurement	2405	0	2405
Construction Procurement	0	550	550
A.E.C. Procurement	469	101	570
Total	2874	651	3525
Requisitions Placed During April			
Operations Procurement	2592	0	2592
Construction Procurement	0	488	488
A.E.C. Procurement	459	62	521
Total	3051	550	3601
Requisitions on hand 4-30-54			
Operations Procurement	774	0	774
Construction Procurement	0	251	251
A.E.C. Procurement	290	87	377
Total	1064	338	1402

Purchase Orders Placed	HW	HWC	Total
Operations Procurement	2182		2182
Essential Material	41		41
Construction Procurement		418	418
Local Purchase	26	1	27
Total	2249	419	2668

Value of Orders Placed			
Operations Procurement	$ 802,636.71	$	$ 802,636.71
Essential Material	643,954.11		643,954.11
Construction Procurement		493,593.03	493,593.03
Local Purchase	258.11	23.60	281.71
Total	$1,446,848.93	$ 493,616.63	$1,940,465.56

Alterations Issued	Increase	Decrease	No Change	Total
HW Operations	59	42	7	108
Essential Material	9	6	1	16
HWC Construction	29	21	4	54
Total	97	69	12	178

Value of Alterations Issued	Increase	Decrease	Total
HW Operations	$ 11,547.40	$ 11,524.74	$ 23,072.14
Essential Material	70,865.95	74,633.92	145,499.87
HWC Construction	25,234.09	36,586.47	61,820.56
Total	$ 107,647.44	$ 122,745.13	$ 230,392.57

Government Transfers	OR	ORC
	2	0

Organization and Personnel	3-31-54	4-30-54	Change
Employees on Roll	26	25	-1

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PURCHASING AND STORES SECTION
CONSTRUCTION PROCUREMENT UNIT
APRIL, 1954

On April 19th, 52 requisitions were received from Minor Construction covering various items of construction material with the required delivery date of April 26th and April 28th. In order to place these orders and have delivery as required, it was necessary for the Buyers to work a 10 hour day during the week of April 19th. All present indications are that the material will be received as required.

Also on April 19th, six requisitions were received from Minor Construction covering the fabrication of 11 vessels, some of stainless steel, some of aluminum and some of sheet metal. The required delivery on the plant was May 10th. All orders are placed and it appears that delivery of the fabricated vessels will be within the specified time.

The work load of the Construction Procurement Unit continues at a high level. Requisitions received during April amounted to 550 as compared to 475 in March. The unit was unable to maintain its position even through the use of overtime. Requisitions on hand at the end of April numbered 251 as compared with 189 at the end of March.

Organization and Personnel	3-31-54	4-30-54	Change
Employees on Roll	19	18	-1

121441

PURCHASING AND STORES SECTION
OPERATIONS PROCUREMENT UNIT
APRIL - 1954

Statistical and General

The workload of the unit remained at a high level during the month, although it showed signs of diminishing during the last week of the month. The following table table shows the exact level:

Requisitions Received		
October	-	1704
November	-	1817
December	-	1959
January	-	2179
February	-	1975
March	-	2703
April	-	2405

The expediting workload increased on additional 1.4% during the month, and the open orders on hand, as of April 30, were 2427.

Essential Materials

The change in programming in the P-10 program required the cancellation of a number of orders with the Aluminum Company for special aluminum wafers. Cancellation charges have been submitted by the Aluminum Company and alterations to the order are in process.

Forecasts for Steam Coal covering our requirements for fiscal year 1955 have been received from the consuming departments, and the draft for the request for quotation has been submitted to the Commission for approval. It is anticipated that awards will be made prior to June 1, which will allow sufficient time for the negotiation of contracts before the end of the fiscal year.

Essential Materials Contracts

1. Aluminum Nitrate Nonahydrate - contract has been drafted, approved by the Law Department, and submitted to General Chemical Division, Allied Chemical and Dye Corp., for signature.

2. Aluminum Sulfate - contract has been drafted, approved by the Law Department, and submitted to the vendor for signature.

3. Sodium Dichromate - contract has been approved by the vendor and returned for G.E. and A.E.C. approvals.

4. Tributyl Phosphate - the successful vendor was Van Waters and Rogers, Inc.; award has been made and the contract is being drafted.

Organization and Personnel

	3/31/54	4/30/54	Change
Employees on roll	31	32	+ 1

1214442

PURCHASING AND STORES SECTION
STORES UNIT
APRIL 1954

STATISTICAL AND GENERAL

Conditions causing back orders are being studied closely and action taken has reduced them from a high of 2028 in January to 1091 for the week ending April 30, 1954.

Receiving volume is very heavy and has increased rapidly during the last thirty days. Total shipments for week ending March 19, 1954 were 1354 while total shipments for week ending April 23, 1954 were 1721. Continued heavy procurement in April will tend to further increase the receiving load in May.

Plans are progressing on schedule for the physical inventory of excess material and equipment scheduled for June 2, 3 and 4, 1954.

The proposed 300 Area Stores in the 325 Building has been rejected and consideration is now being given to a location in the 3706 Building.

Work on the Standard Stock Numbering System is progressing satisfactorily. The basic work is mostly complete and preparation of catalogs will start in May.

A scrap sale covering non-ferrous materials was quite successful as the returns were higher than expected. Plans are being made to dispose of some 2,000,000 pounds of ferrous scrap metal located in the White Bluffs area.

Except for a few minor details the 18 month old SAR program to establish departmental responsibility for Spare Parts items is complete.

In the Excess Material and Equipment Accounts the following items are reported:

Disbursement by store order	$ 73,029
Transfers to inventories	2,886
Offsite shipments	611,004
Receipts	296,434

Organization and Personnel	3-31-54	4-30-54	Change
Employees on Roll	187	191	+4

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PURCHASING & STORES SECTION

TRAFFIC UNIT

April, 1954

STATISTICAL AND GENERAL

Successful negotiations were completed with the rail carriers for a reduction in the freight rate on Liquid Aluminum Sulphate, to move in tank cars from Portland, Oregon. The savings in freight charges on the current order will amount to approximately $11,500.00.

Upon receiving advice from the "field" that they were authorizing the expenditure of $1,030.34 for air freight transportation on 3,772 lbs. of steel bars from Huntington, West Virginia, the Traffic Unit inquired into the firm shipping dates and the project deadline dates for this material. At our recommendation, a portion of the material was shipped via Railway Express, and the balance was shipped via a carloading company. The material was received on schedule, and the savings in freight charges amounted to $672.42.

A suggestion to the Purchasing Unit that they secure alternate bids on an FOB: Shipping Point basis with the suppliers of Tributyl Phosphate has resulted in a lower delivered price of this material, amounting to approximately $3,500.00 for the next year. The reduction was obtained through our recommendations that the material be shipped in larger quantities, and that the freight classification description be changed to read "Lacquer Solvent or Plasticizer," instead of "Chemicals, NOI."

As a result of rate reductions obtained from the carriers, there was a total savings in freight charges for the month of April amounting to $1,636.45. This makes a total savings from September 1, 1946 to date of $1,764,476.35.

Savings Report

1. Rate reductions obtained from carriers:

Commodity	Origin	Savings for April, 1954	Savings from 9-1-46 thru March, 1954	Savings from 9-1-46 to date
Aluminum Extrusions	Edgewater, N.J.	$ 556.33		
Caustic Potash	Pittsburg, Cal.	341.21		
Machinery, T/L	Los Angeles, Cal.	275.88		
Silicate of Soda	Tacoma, Wash.	463.03		
		$1,636.45	$1,762,839.90	$1,764,476.35
2. Freight Bill Audit		1,449.99	119,648.65	121,098.64
3. Loss and Damage & Overcharge Claims		263.14	137,439.85	137,702.99
4. Ticket Refund Claims		814.03	37,892.66	38,706.69
5. Household Goods Claims		6.72	17,635.13	17,641.85
		$4,170.33	$2,075,456.19	$2,079,626.52

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PURCHASING & STORES SECTION
TRAFFIC UNIT
APRIL, 1954

Work Volume Report

Completed Travel Requests		132
Reservations resulting from above:	Rail	45
	Air	162
	Hotel	168
Expense Accounts Checked		226
Household Goods & Automobiles	Movements Arranged Inbound	2
	Movements Arranged Outbound	2
	Insurance Riders Issued	1
	Claims Filed	1
	Claims Collected - Number	1
	Claims Collected - Amount	$6.72
Ticket Refund Claims	Filed	11
	Collected - Number	23
	Collected - Amount	$814.03
Freight Claims	Filed	7
	Collected - Number	7
	Collected - Amount	$263.14
	Over and Shorts Processed	4
	Damage Reports Processed	9
Freight Bill Audit Savings		$1,449.99
Freight Shipments Traced		24
Quotations	Freight Rates	267
	Routes	215
Bills Approved	Air Freight	3
	Air Express	32
	Boat	1
	Carloading	160
	Express	162
	Rail	755
	Truck	239
Carload Shipments	Inbound	781
	Outbound	2

Report of Carloads Received

Commodity	CMSTP&P	NP	UP	TOTAL
Aluminum Extrusions	1	2	2	1

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PURCHASING & STORES SECTION
TRAFFIC UNIT
APRIL, 1954

Report of Carloads Received (cont.)

COMMODITY	CMSTP&P	NP:	UP	TOTAL
Aluminum Sulphate	3	2	2	7
Asphalt	1			1
Caustic Soda	12	12	12	36
Chlorine		2		2
Chromium Nitrate			1	1
Coal	103		580	683
Heat Exchangers			1	1
Lacquer Solvents		1		1
Lime		3		3
Limerock	2		2	4
Machinery	2			2
Methyl Isobutyl Ketone		1	1	2
Methanol		1		1
Nickel Sulphate			1	1
Nitric Acid		6	5	11
Partitions			2	2
Phosphoric Acid		1	1	2
Potash, Caustic		1		1
Salt	1	1	1	3
Silicate of Soda	2	1		3
Soda ash		1	1	2
Steel	1			1
Steel Containers		1		1
Sulphuric Acid	1			1
Tanks			2	2
Transformer Oil		2		2
Merchandise & Stop Cars		1	3	4
	129	37	615	781

Organization & Personnel	3-31-54	4-30-54	Change
	9	9	0

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TRANSPORTATION SECTION
MONTHLY REPORT
April 1954

DECLASSIFIED

GENERAL

Transportation Section personnel forces increased from 485 to 486 by seven new hires, two reactivations - personal illness, three transfers out, three terminations, and two deactivations - personal illness.

A revised organizational structure for the Transportation Section has been developed and approved whereby one supervisory step is to be eliminated. This change will result in a section of six units as compared to four under the present organization and a reduction of two exempt positions. Several changes in supervisory assignments are necessary to complete the reorganization and will result in one supervisor being downgraded to his former non-exempt classification and utilizing another to fill an existing vacancy. The revised organization is to become effective May 1, 1954 except for cost and payroll considerations which were made effective on April 26 to conform to the fiscal calendar.

A & B Committee approval was obtained on April 12 for the upgrading of 50 sedans and 36 units of heavy mobile equipment.

The Transportation Section has completed the acceptance of property management responsibilities with respect to the control and issuance of license plates for government owned equipment. The Atomic Energy Commission turned over all custodial records pertaining to this function.

Construction of the Consolidated Transportation Facility progressed from 35% on March 25 to 56% on April 23 compared to the scheduled 62%. Craftsmen engaged in this activity averaged from 75 to 83 during this period.

During April a considerable number of automotive vehicles were found to be contaminated to varying degrees. Steps were taken to provide a temporary decontamination center with necessary equipment in the 269-W (TC) Building. Actual decontaminating work is scheduled for May 3 with labor services to be furnished by the Transportation Section.

Arrangements have been made with the Radiation Monitoring Unit to check all equipment for possible contamination before delivery to the excess yard.

RAILROAD ACTIVITIES

Commercial cars handled during April were approximately the same as March except for the slight decline in construction materials. The following recapitulation indicates the distribution of commercial cars handled:

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Transportation Section

Carload Movements -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	693	20	23	680
A.E.C.	34	0	0	27
AEC - Kaiser Engineers	62	0	0	56
Blaw-Knox	47	0	0	39
Bumstead & Woolford	15	0	0	14
Cisco Construction Co.	2	0	0	1
Cyclone Fence Company	2	0	0	2
Gaasland Construction Company	1	0	0	2
L. H. Hoffman Company	5	0	0	7
Kaiser Engineers	62	0	0	65
D. V. Libby & Company	3	0	0	3
Sound Construction Company	13	0	0	14
Thorne & Marble	1	0	0	1
C. D. West	1	0	0	2
U.S. Army	14	0	0	13
U.S. Geological Survey	0	0	0	2
	955	20	23	928

Process service continues to be handicapped by restrictive operative conditions from uncontrolled contamination; however, an effort has been made to alleviate scheduling difficulties which may permit a reduction in overtime. Actual process cars handled in April decreased 32.44% over March because of a prolonged shutdown of production facilities and only required 302 man-hours of overtime.

Total car movements including process service totaled 2,267 in April compared to 2,482 in March, 2,624 in February, and 2,545 in January.

Locomotive 39-3722 which was deactivated in March because of decontamination was released on April 7; however, a check on April 22 disclosed general contamination and it was removed from service to the 200-West Area for re-processing.

AUTOMOTIVE ACTIVITIES

The Plant Bus System transported 5.78% more passengers in April than in March primarily because of the greater number of working days in the reporting month. The following statistics indicate the magnitude of service rendered:

Passenger volume	147,305
Revenue - bus fares	$ 7,365.24
Earnings - transit advertising (March)	$ 71.91
Bus trips	6,920
Bus miles - passenger carrying	195,226
Passenger miles	4,526,567

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Transportation Section

The Richland Bus System transported 1.68% more passengers in April than in March as the greater number of working days in the reporting month offset the normal seasonal decline. The following statistics indicate the volume of service rendered:

Total passengers including transfers	13,357
Revenue - bus fares	$ 846.12
Earnings - transit advertising (March)	$ 3.27
Bus trips	1,200
Bus miles - passenger carrying	6,360
Passenger miles	33,000

Special bus transportation was provided on April 1 for a tour of the Manufacturing Areas by approximately 30 visiting officials of the Detroit Edison Company.

Off-Plant chauffeured automobile trips (Company business and/or official visitors) totaled 111 which were rendered to the following locations as indicated:

Benton City, Washington	6
Grandview, Washington	1
Hinkle, Oregon	15
Kennewick, Washington	7
Pasco, Washington	54
Pendleton, Oregon	15
Prosser, Washington	1
Richland "Y", Washington	2
Sunnyside, Washington	2
Walla Walla, Washington	3
West Richland, Washington	1
Yakima, Washington	4

The following tabulation indicates the volume of fuel distribution by Equipment Maintenance personnel:

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at start of month	44,390	23,255	5,000	1,311	257
Received during month	114,909	18,900	36,600	4,862	0
Dispensed during month	109,929	20,825	29,600	3,673	58
Stock at end of month	49,370	21,330	12,000	2,500	199

The following tabulation indicates the volume of inspection and maintenance service rendered to Hanford Atomic Products Operation automotive and heavy equipment by Equipment Maintenance personnel:

Motor overhauls	68
Class A Inspections and Repairs	132
Class B Inspections and Lubrications	1,128
Semi-monthly Inspections - Buses	126
Weekly Inspections - Fuel Trucks and Off Plant vehicles	104
Other routine maintenance repairs and service calls	2,384
Accident repairs and paint jobs	41
Tire repairs	550
Wash jobs	465
	4,998

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Transportation Section

The following tabulation indicates the Plantwide usage of automotive equipment:

Code	Type	No. of Units	Total Mileage
1A	Sedans	337	642,410
1B	Buses	98	228,769
1C	Pickup Trucks	460	294,299
1D	Panel,Carryall,Sta.Wagons	154	159,614
1E	Armored Cars	1	195
1G	Jeeps	2	382
68 Series	Trucks	206	94,133
		1,258	1,419,802

Completed the modification of 14 sedan delivery trucks to meet security requirements for the transporting of classified documents.

LABOR ACTIVITIES

Clean-up of the 600 Area progressed with removal of all Patrol boxes at roadway intersections; cleaning and burning debris from all old building sites along roadways in the White Bluffs area; and piling of debris for burning around the Central Shops area.

The covering of contamination in the vicinity of the 200 Areas which was begun in January has been completed. This involved approximately eight miles of surfaced areas which were seal coated and about ten acres of non-surfaced areas which were covered with pit-run gravel. In addition one mile of contaminated roadway in the 100-B Area was seal treated.

Maintenance of primary roads required 1,253 man-hours; secondary roads 40 man-hours; walkways, parking lots, and related ground maintenance in the Manufacturing Areas required 103 man-hours.

The following tabulation indicates in tons the volume of road asphalt material handled by Road Maintenance personnel:

	MC 3	MC 5
Stock at start of month	54.69	79.97
Received during month	0	0
Used during month	23.90	10.00
Stock at end of month	30.79	69.97

The following tabulation indicates the volume of road aggregate materials handled by Road Maintenance personnel:

	3/4" to 0 Pre-mix Tons	½" to 0 Pre-mix Tons	5/8" Chips Cu.Yd.	1/4" Chips Cu.Yd.	3/4" Crushed Rock Cu.Yd.
Stock at start of month	523	474.0	3,297	4,340	1,454
Made during month	0	0	0	0	4,420
Used during month	231	254.5	88	234	3,101
Stock at end of month	292	219.5	3,209	4,106	2,773

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May 6, 1954

ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION

MONTHLY REPORT

April, 1954

GENERAL

The Section total work force was one hundred and sixty-eight (168) as of April 30, 1954, no change from last month.

A new Plant electrical peak was established during the month, exceeding the previous billing demand by 157 KW.

Date	Demand KW	March Comparative KW Demand
4-20-54 (10:30 AM-11:00 AM)	117,400	117,243

Procedures were outlined and preparations begun for the Section material inventory which is scheduled May 20-21, 1954.

Overtime hours for the month amounted to 2.6% of scheduled time for the Telephone Unit, and 2.0% for the Electrical Distribution Unit. Of these amounts, 2.1% and 1.2%, respectively, were instigated by customers' service requests.

ELECTRICAL DISTRIBUTION UNIT

Maintenance and Operation

At 2:09 PM, April 8, 1954 the Coulee-Midway No. 2 line relayed out and was immediately reclosed. The result of disturbance on the HW system caused 105-F to scram.

On Saturday, April 24, a series of power outages were conducted within the 300 Area in order to test the ventilating systems in the new laboratory buildings. This also afforded the first opportunity to verify the blackout switch and system for the entire 300 Area.

The deteriorated 251 Substation battery was replaced on April 28 with new Exide battery cells of proper capacity which were authorized by Appropriation Request 54-S-38.

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ELECTRICAL DISTRIBUTION (Continued)

System Expansion and Planning

On April 7, the in-line switch and dead-end structure for the West tap to the 100-K Area were installed and cut into the existing 230 KV line. The work was accomplished in approximately 14 hours on a planned critical power grade "W" and the line was energized at 8:20 PM. A similar operation is planned for May 5 to connect the East leg to 100-K Area.

The new double circuit 13.8 KV line constructed to supply power to the Purex Plant was inspected and energized on April 16. One circuit of this line now supplies power to the 241-C Tank Farm.

Tests on high voltage cables at 100-K West continued with some tests performed by BPA demonstrating their 50,000 volt DC Beta tester.

TELEPHONE UNIT

Maintenance and Operation

Work was begun in preparation for increasing the number of direct-dialing amplified circuits between Richland and the BY exchanges from 3 to 12 on May 1, 1954.

Equipment was installed which will transfer trunks from the Richland exchange switchboard to the future official exchange switchboard allowing the Richland board to be closed during certain shifts.

On April 27, a child accidentally fired a rifle into a neighboring residence. The bullet struck and ruined the telephone instrument.

The traffic study conducted by the Operations Analysis Group was completed on April 1; the reconnecting of the switches in the Richland exchange, as recommended by this study, was completed April 17. It is planned to conduct further surveys in order to check the improvement resulting from this work.

System Expansion and Planning

The installation of telephones served from the North Richland exchange was started April 3, 1954. To date 129 subscribers have been served and it is estimated that a total of 200 will be installed by May 15, 1954.

Installed a 10-pair terminal and a multiple type station protector near the 200-W Fire Station to provide additional circuits and eliminate long spans of service wire.

A field inspection trip was made with officials of the Richland TV Corp. to point out violations of construction specifications and impaired clearance problems caused by their construction methods.

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TELEPHONE UNIT

System Expansion and Planning (Continued)

A summary of telephone service is as follows:

	Subscriber Stations In Service		Lines Available For Service	Sides Available For Service	Exchange Lines In Service
	Res. and Misc.	Official			
Richland	6094	989	21	347	4034
N.Richland	489	219	139	29	420
Process Areas	24	1877	342	-	1710
Total	6607	3085	502	376	6164

Richland-North Richland four-party service:

	April 20, 1954	March 20, 1954
Number of Subscribers	1390	1234
Number of Vacant Sides	230	150

Seventy-one (71) new requests for telephone service in Richland were received, making the backlog two hundred and thirty-five (235).

Service orders during the month were as follows:

Residential and commercial	510
Official (permanent)	225
Official (temporary)	55
Total	790.

R R Britton
ELECTRICAL DISTRIBUTION
AND TELEPHONE SECTION

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POWER STATISTICS
ELECTRICAL DISTRIBUTION AND TELEPHONE SECTION
FOR MONTH ENDING APRIL 30, 1954

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
230 KV System						
A-2 Out (100-B)	25830	25040	43400	45400	80.0	76.6
A-4 Out (100-D)	15930	14860	24400	24300	87.7	84.9
A-5 Out (100-H)	9390	9420	14700	14800	85.9	88.4
A-6 Out (100-F)	8990	9130	14400	14300	83.9	88.7
A-8 Out (200 Area)	6080	5600	9500	9500	86.0	81.9
TOTAL OUT	66220	64050	106400**	108300**	83.7	82.1
MIDWAY IN	66803	67795	104000*	105600*	86.3	89.2
115 KV System						
B1-S4 Out (N. Rich.)	2448	1978	4608	4262	71.4	64.5
B1-S5	108	94	432	432	33.6	30.3
Richland	11278	9650	22080*	21440*	68.6	62.5
BB3-S4 Out (300 Area)	2032	1744	3520	5520	77.6	43.9
TOTAL OUT	15866	13466	30640**	31654**	69.6	59.1
Benton In	16140	13920	41600*	34000*	52.1	56.9
So. Richland In	0	20	0	2000*	0	1.4
TOTAL IN	16140	13940	41600**	36000**	52.1	53.8
66 KV System						
B9-S11 Out (100-K)	1776	1614	3120	3120	76.5	71.9
B7-S10 Out (W. Bluffs)	576	486	1418	1350	54.6	50.0
Hanford Out	78	64	300**	300**	34.9	30.0
TOTAL OUT	2430	2164	4838**	4770**	67.5	63.0
HANFORD IN	2713	3552(1)	11000*	12600*(2)	33.1	39.1
Project Total						
230 KV Out	66220	64050	106400**	108300**	83.7	82.1
115 KV Out	15866	13466	30640**	31654**	69.6	59.1
66 KV Out	2430	2164	4838**	4770**	67.5	63.0
TOTAL OUT	84516	79680	141878**	144724**	80.1	76.5
230 KV In	66803	67795	104000*	105600*	86.3	89.2
115 KV In	16140	13940	41600**	36000**	52.1	53.8
66 KV In	2713	3552(1)	11000**	12600**(2)	33.1	39.1
TOTAL IN	85656	85287(1)	156600	154200(2)	73.5	76.8

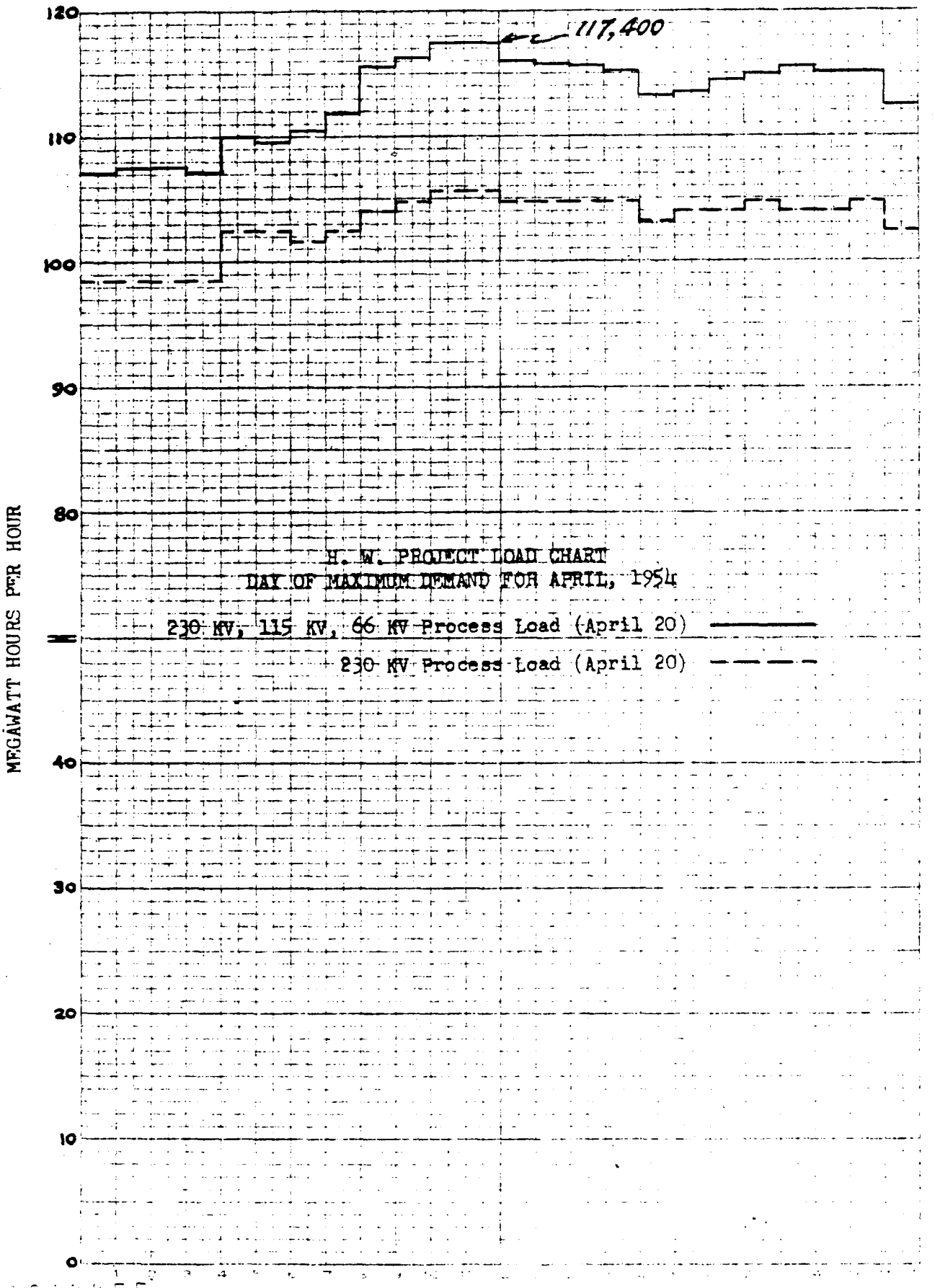
* Denotes Coincidental Demand
** Denotes Non-Coincidental Demand
(1) Includes 1238 MWH of "K" Test Power
(2) Includes approximately 7100 KW of "K" Test Demand

Average Power Factor - 230 KV System 95.5
Average Power Factor - 115 KV System 90.9
Average Power Factor - 66 KV System 79.8

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PLANT AUXILIARY OPERATIONS DEPARTMENT
OPERATIONS ANALYSIS SECTION

MONTHLY REPORT - APRIL, 1954

Personnel Statistics

Following is the month end summary of personnel:

Operations Analysis Section

	As of 3-31-54			As of 4-30-54			Net Change		
Unit	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
General	1	1	2	1	1	2	0	0	0
Applied Mathematics	22	5	27	21	4	25	-1	-1	-2
Computing	6	47	53	6	46	52	0	-1	-1
Graphics	1	11	12	1	10	11	0	-1	-1
Procedures	12	3	15	11	3	14	-1	0	-1
TOTAL	42	67	109	40	64	104	-2	-3	-5

Applied Mathematics Unit

	As of 3-31-54			As of 4-30-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	3	4	1	2	3	0	-1	-1
Administrative Statistics	5	0	5	5	0	5	0	0	0
Technical Statistics	5	0	5	5	0	5	0	0	0
Mathematical Analysis	3	0	3	3	0	3	0	0	0
Numerical Analysis	8	2	10	7	2	9	-1	0	-1
TOTAL	22	5	27	21	4	25	-1	-1	-2

D. O. Banks attended a meeting of the American Mathematical Society in Chicago, Illinois on April 29, 30, and May 1.

D. D. McCracken was transferred to the Aircraft Gas Turbine Division on April 19. One steno-typist terminated on April 23.

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puting Unit

	As of 3-31-54			As of 4-30-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	0	1	1	0	1	0	0	0
Audit and Control	1	6	7	1	5	6	0	-1	-1
Key Punching	1	21	22	1	21	22	0	0	0
Machine Processing	3	20	23	3	20	23	0	0	0
Total	6	47	53	6	46	52	0	-1	-1

One tabulating machine operator of the Audit and Control group terminated effective 4-16-54.

Graphics Unit

	As of 3-31-54			As of 4-30-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	2	3	1	2	3	0	0	0
Illustrators	0	7	7	0	6	6	0	-1	-1
phic Designers	0	2	2	0	2	2	0	0	0
TOTAL	1	11	12	1	10	11	0	-1	-1

One graphic illustrator terminated effective 4-23-54.

Procedures Unit

	As of 3-31-54			As of 4-30-54			Net Change		
	Ex	Non-Ex	Total	Ex	Non-Ex	Total	Ex	Non-Ex	Total
Staff	1	1	2	1	1	2	0	0	0
Clerical	0	2	2	0	2	2	0	0	0
Operation Analysts	11	0	11	10	0	10	-1	0	-1
TOTAL	12	3	15	11	3	14	-1	0	-1

One Operations Analyst terminated effective 4-23-54 to enter service in the Coast Guard.

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FOR THE MANUFACTURING DEPARTMENT

Procedures have been written and boards wired for the automatic recording, analysis, and reporting of panellit gauge data from all areas. In view of the recent installation of many gauges which may be adjusted without interfering with normal reactor operation, it was deemed advisable to maintain a current record of the gauge status of every tube in every reactor. It is expected that adjustments of these gauges will be made frequently as part of the standard operating procedure for raising power level and reducing pumping pressures; hence an accurate and economical means of noting these changes is desirable. This can be accomplished quite adequately by maintaining a punched card file and issuing reports routinely to operating personnel.

The first attempt to obtain a correlation between slug rupture rate and exposure and power in C-reactor was unsuccessful. Following a meeting with representatives of the Process Improvement Group, a new method was devised. It is hoped that this method will yield more conclusive results.

A sampling plan is being set up in which the distribution of the coal in a fire box will be studied for various operating methods of supplying coal to the furnaces. One furnace will be shut down, and sampling within the furnace will be used to determine the coal distribution for various rates of supplying the coal to the furnace by the stoker and different sizes of coal particles. If a method for supplying coal to the furnaces can be determined to obtain better efficiency, considerable savings could result due to the large amounts of coal consumed at Hanford.

A set of tables was prepared for use with an instrument designed to measure the specific gravity of a liquid. A drop of this liquid is allowed to fall through another liquid of known density, and the time of descent measured. These tables give specific gravity as a function of time of descent for seven different experimental arrangements, and were calculated by solving a quadratic equation on the card-programmed-calculator.

The further analysis of attitude survey data for the Reactor Section has been completed. Attitudes of employees in the various personnel classes within each subsection were analyzed separately. In addition, the attitudes of the same classification of employees in separate areas within each of the three main sub-sections were compared statistically and a summary of all written comments was prepared. (Report: "Attitude Survey Results -- Reactor Section", to J. H. Warren.)

For the Manufacturing Department 3 routine IBM reports and 19 non-routine jobs were completed for a total of 22 IBM service requests.

Considerable progress was made this month in the fabrication and assembly of the Redox Model being constructed for the Separations Section. The architectural portions of the silo, canyon and service facilities are approximately 95% complete. Final assembly of the building walls and general frame work is scheduled for completion the first week of May. Fabrication of operating equipment, tanks,

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sels and columns is now in progress. These units are scheduled to be installed by the later part of May. Graphics is preparing a series of training aids for the Metal Preparation Section. These drawings primarily cover canning processes showing mechanical comparisons between the old and new methods, production increases and cost savings.

Additional graphics services conducted for the Manufacturing Department included posting current data to and issuance of the Manufacturing Control charts; preparation of a chart titled "Average Percent Turnover 1949-1953"; and completion of miscellaneous budget and cost charts.

FOR THE ENGINEERING DEPARTMENT

The relationship between the distance between atomic planes in graphite and the amount of exposure of the graphite is to be estimated from experimental data. The formulas required for estimation of the relationship, confidence intervals about the estimated line, and tests of hypotheses for weighted regression were submitted. (Oral report and outline: "Simple Linear Weighted Regression for the Case of Weights Known Without Error", to J. R. Townsend.)

The report covering the quality of the metal produced at both the Feed Materials Production Center and the Mallinckrodt Chemical Works was delayed due to more pressing matters. The study will be concluded early in May.

At the request of the Advanced Technology Sub-Section, calculations relating to design of a warm-canning press were carried out. This instrument consists essentially of a coil of wire through which a current is passed, and inside which the slug to be bonded is clamped in place by two end pieces. The problem is to determine the spacing of the coils so as to insure a uniform temperature over the surface of the slug, and at the same time maintain a physically realizable flow of heat into the end pieces. Several different arbitrary temperature distributions (in effect, coil-space distributions) were studied in an attempt to find one with desirable heat-flow characteristics. The original formulation of the problem broke down when a divergent series was encountered. A second formulation gave better results, and one pattern was obtained with the desired properties. A good deal of effort was spent in making these results avialable in time to set design specifications for this instrument.

Several slugs which failed under irradiation had their aluminum jackets stripped off and the billet numbers were obtained from the ends of the bare slugs. All available information on the chemical analyses and density of the heats from which these billets came was provided the Uranium Quality group of the Pile Fuels Sub-Section. It is hoped that these data would shed some new light on the cause of slug failures.

For the purpose of further investigation into the causes of slug failure during irradiation, a study was made of boron analyses of uranium metal cast at Mallinckrodt Chemical Works during the months of January, February, March, and April 1953. Percentages of the total number of boron analyses within certain ranges or

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groupings were determined. These percentages were compared with those of the heats from which ruptures are known to have come. (Verbal report to the Uranium Quality Group of the Pile Fuels Sub-Section.)

As a result of a recent meeting with the Process Control and Analysis Group, the Group Nine Metal Study will undergo a major revision. This study was initiated over two years ago in all efforts to find observable causes of slug-rupture. Metal charged into the piles was classified into groups, and exposure and power data on these groups calculated routinely. It was necessary for statistical purposes to make power calculations on all tubes in a group until the last tube in that group had been discharged. The present revision calls for classifying metal by Hanford lot number, in the hope of correlating ruptured-slug data with lot variables as well as power and exposure. Reports to be issued include exposure distributions by reactor by lot, for both active tubes and tubes discharged since the previous report; power distributions for all active tubes; and an exposure distribution forecast for all active tubes. All tubes in all areas will be included in this study.

Considerable data have been collected on rupture rates of various slug types and numerous comparisons have been attempted to determine the best type of slug. Using only production results, a large amount of information would be required to precisely estimate the small percentage associated with rupture rates. Due to the many factors affecting rupture rates and the fluctuating operating conditions, it has been difficult to obtain sufficient information under comparable conditions to accurately compare rupture rates of various slug types. A test procedure has been devised which will greatly reduce the amount of data required and will result in objective decisions concerning the better of two slug types being compared. A thorough statistical investigation of the variation expected indicated that a test based on the average difference in the MWD/t at rupture with as few as two tubes of each type of material has a good chance of discriminating between the two materials. Definite probabilistic statements indicating if significant differences exist between rupture rates of the materials compared were tabulated. Since a very few tubes will be required for each test, a flexible program of testing materials at the same time in adjacent tubes in order to expose the material under similar conditions will be possible. Also, due to the small size of the test, a large number of tests under different operating conditions can be effectively carried out. (Letters to L. W. Lang, April 16 and April 28, 1954.)

Additional work was done on the calculation of expected frequencies of excessive temperatures caused by local power surges in the piles. The original work was completed in August, 1953, and the additional work involved calculating expected frequencies for a different set of fundamental assumptions. (Verbal report: April 2, 1954 to S. S. Jones.)

Additional computational work was performed in connection with the pressure and water quality relation in a reactor process tube. New constants were used in an attempt to reconcile the continuing discrepancy between calculated and observed values. It is not presently known whether these discrepancies are due to experimental error or to an incorrect formulation of the problem. A decision on how to proceed with the problem is waiting on further study of two-phase flow and verification of the present formulation.

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ample of data from the single column data reduction experiment in C-reactor has been received. These data are punched in paper tape at the pile by an automatic recorder, and consist of periodic readings of some ten variables associated with the particular tube. Work is proceeding on the development of a procedure for transcribing the data from the tape to cards, decoding the data, and calculating the necessary information. Since all the data are coded, it will be necessary to convert the coded information to meaningful numbers before an analysis can be made. Two methods for doing this are under consideration; one method is to perform a card table look-up operation on the coded data, the other to calculate the desired quantity by means of an empirical curve fitted to the coded data. Which method is used will depend largely on the ease with which the method may be modified in the event that the recording instruments are recalibrated. Starting in May, data will be received and processed daily. This study is the most refined attempt to date at estimating the precision of the present methods for computing exposure and at suggesting improved methods for this computation. It is expected that a large amount of statistical analysis will be made on the data.

The first set of data on tubes with J-Q loading (alternate enriched uranium and thorium slugs) in H-reactor has been received. This data consists of temperature and pressure readings from 36 tubes, of which 13 actually carry the special loading. From these data it will be possible to calculate individual tube powers and exposures in much the same manner as the analysis of the hot spot in C-reactor is being carried out. Temperature maps on these tubes will be recorded daily, and processed monthly along with pressure and power level data. The study will continue for some six months, during which time the results will be used to analyze the all-important yield characteristics of the new type of loading.

One method of estimating the corrosion rate for the maximum corroded slug in a given tube consists in analyzing the influent and effluent water for alum content. It is known that this method of estimation is not too accurate, and hence, when comparing corrosion rates in two tubes, this measurement error must be considered. A discussion was held with a member of Pile Coolant Studies on the statistical aspects of this problem. (Verbal report: April 7, 1954, to Don deHalas.)

Work had been done some time ago on the relationship between corrosion rate and slug surface temperature for water type 10. The report issued at that time indicated that a similar relationship was thought to exist for water type 40, but insufficient data was available to test the validity of this. Recently, enough data has accumulated to establish this relationship for fixed slug power. Further, an estimate of the corrosion rate as a function of slug power and slug surface temperature was found. (Secret Rough Draft: April 16, 1954, "Corrosion Rate vs. T_s," to S. Goldsmith.)

A functional relationship was estimated relating slug corrosion rate to flow rate for various tube powers. An equation expressing the corrosion rate directly as a function of flow rate and tube power was also found. This proved to be a fairly good fit for the range of values of tube powers of greatest practical interest, but the resulting equation was not valid for higher tube power levels. It was pointed out that by fitting a polynomial of high enough degree, a relationship could be found that would hold for higher power levels too, but it was decided

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that the first equation would suffice. The purpose of this whole study was to set safe operating limits for the piles from the viewpoint of determining what limits could be reached before the amount of corrosion expected would exceed a given tolerable limit. (Secret Rough Draft: April 29, 1954, "Corrosion Rate vs. Flow Rate", to S. Goldsmith.)

It is known that many factors, some highly correlated, affect the corrosion rate of a slug, but no explicit relationship has been found to date expressing the corrosion rate as a function of more than one or two of these pertinent variables. Working from a theoretical viewpoint, a member of pile coolant studies has developed an equation involving five unknown parameters and four independent variables. The "best" curve of this type is currently being fitted to some water type 40 corrosion data.

Considerable interest has been expressed lately in calculations of the yields of the heavy isotopes under neutron bombardment. The original problem was formulated to yield information on the cross-sections and yields of the heavy isotopes of plutonium and americium, and at the same time indicate the validity of earlier calculations of Pu_{240} yields. Since then the problem has been modified to include the Np_{240} isotopes; by comparing the actual and calculated yields of this isotope, it will be possible to arrive at a much better estimate for the neutron capture cross-section of Np_{239}, one of the links in the chain from uranium to plutonium. A similar type of calculation is in progress to determine the yield of fissionable isotope U_{233} from given amounts of thorium. This information is vital to the study of thorium as a possible reactor fuel. All of the above calculations consist essentially of the solution of simultaneous linear differential equations. In addition, a more refined version of the original problem has recently been undertaken. In this version, certain quantities which are treated as constants in the original problem are considered as variables depending both on time and the concentration of various isotopes, which in turn depend on time. The result is a set of highly non-linear differential equations. These are to be solved by straight-forward numerical methods on the card-programmed-calculator. Parameters allowed to vary in these calculations include the enrichment ratio of the unexposed metal, and the resonance escape probability, fast effect, and average neutron cross-section of unexposed U_{238}.

Using the standard conversion formula for product build-up, the isotopic concentration of plutonium was calculated for several values of enrichment. The work was requested by the Advanced Technology Sub-Section.

The solution of two sets of linear algebraic equations were carried out for the Metallurgy Group. The equations arise in formulating the material balance conditions in a separations column. Both sets consisted of seven equations in seven unknowns. These were reduced to six by six systems, and solved on the card-programmed-calculator by techniques recently developed for another totally unrelated problem.

Purex and Redox extraction scrub studies have been conducted with plant and laboratory prepared dissolver solutions. Decontamination factors of the various

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solver solutions were estimated. Statistical analyses involving new data were made and additional confidence levels were computed on the data previously analyzed. Comparisons were made in order to determine which experimental laboratory solutions resulted in better decontamination than the plant solutions currently used in the scrub columns. An outline of the statistical methods used in computing confidence intervals on the mean of logarithmic normal distributions, as used for this study, were requested and submitted. (Oral report: on the results of the analyses and letter, "Confidence Interval Estimation", April 26, 1954, to W. W. Schulz.)

The MWD/t values as reported in HW-26584 were revised by personnel of the Separations Technology Sub-Section using the original data on %240 and current estimates of the relationships for %240 vs. neutrons/gram/sec. and neutrons/gram/second. vs. MWD/t. Using these revised MWD/t values and the original g/t values, a quadratic regression curve was fitted. The resulting curve predicts approximately 2% lower g/t values for present operating MWD/t levels than does the current curve. (Oral report to A. E. Smith.)

A preliminary report on the mathematical treatment of fast sources in P-10 piles has been submitted to the Exponential Pile Sub-Unit. Two cases were considered, one with a fully loaded pile and the other having a sizable reflector below the loaded region. It was found that a fully loaded pile leads to considerable mathematical simplification, and, therefore, to a less involved and less costly IBM calculating procedure. However, there are technical arguments in favor of the half-loaded pile which may offset the computational advantages. Whichever procedure ultimately followed, the theory for the exponential pile experiments will be much sounder than it is at present, and more accurate diffusion length measurements should result.

The slowing down of neutrons in reactors is described to a certain extent by the so-called Wilkins integral equation. Solutions for several special cases have been requested by the Advanced Technology Sub-Section. Since the complexity of this equation prohibits any direct analytic solution, a numerical or iterative technique must be used.

Several definite integrals arising in the study of neutron absorption in a cylindrical absorbing rod were numerically evaluated. The integrals involved modified Bessel functions and the K_1 functions. The latter were obtained in earlier work from simple recursion relations with the K_j functions, which have recently been published by G. M. Muller in HW-30323. Standard numerical integration techniques were used.

The Boltzmann equation continued to be a subject of investigation. It is hoped that, with new analytical tools being discovered from time to time, we can eventu[redacted]

In recent weeks, personnel of the Statistics group have been working in conjunction with personnel of the Inspection & Materials Unit to devise a statistical sampling plan to be applied to the sampling of 100-K connectors. It is felt that the application of statistical methods to some of the inspection programs carried on by Hanford personnel could result in considerable savings in terms of manpower and money.

The further analysis of attitude survey data for the Design Section has been completed. Results pertinent to the attitudes of employees in separate personnel classes within each sub-section and the Design Planning Unit were supplied to management, as well as a summary of all comments these employees wrote on the blanks provided by the questionnaire. (Reports: "Attitude Survey Results--Design Section", to O. H. Pilkey, "Attitude Survey Result--Process Engineering Sub-Section", to V. D. Nixon, and "Attitude Survey Result--Design Planning Unit", to J. L. Boyd.)

An explanation of the use of the log-normal distribution was given a member of the radio-chemistry group. Special emphasis was put on the transformation of analytical results back to the original population. (Verbal report: April 16, 1954 to D. G. Miller.)

Routine computational work for the Engineering Department consisted of Special Request Exposure Calculations for April, Group Nine Metal Studies calculations for February, and Lattice Conductance calculations on D-reactor data from July 1953 to March, 1954, and B-reactor data from November 1953 to April 1954.

The conversion of the Classified File from a manual to a punched card system is continuing. The current status of the keypunching part of the conversion is as follows: File Records Cards - 80% complete, Certificate of Destruction - 30% complete, Outgoing Receipts - 15% complete, Incoming Receipts - 5% complete, and miscellaneous changes - started.

Last month a plan to convert the holding records of classified copies in personal custody to a machine records system was proposed and accepted. Subsequently, the Classified Files supervision decided to abandon this plan. The earlier plan of establishing the accountable position of Hanford Atomic Products Operation and then the distribution of these copies within Hanford Atomic Products Operation was re-established.

The daily recording for Classified Files of current issues of new documents of destruction of copies, and of outgoing transfers of accountability was begun. The same information is, for the most part, recorded for the period covering the punching of the master accountability records.

Special graphics work for the Design Section included layout and rendering of ten color plates on the subject "Reactivity Effects vs. Lattice Spacing". The plates were processed into slides for use in a presentation to the Chemical Engineering Society. Seven plates in black and white were prepared on a rush basis for the Design Section to use in a discussion on "Objectives in Nuclear Power Plant Design".

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Purex Project Unit submitted a request to Graphics for dual development of report and slide material on comparisons of Design and Construction Schedules between Redox, TBP and Purex. The slide work was completed on a rush basis and the plates for report use will be completed in the near future. Representatives of this unit have also submitted specifications and detail plans for the development of a series of technical illustrations on specified pieces of equipment in the Purex process.

Graphics work for Applied Research include preparation of a detailed perspective cut-a-way drawing of an "In-Pile Heater Assembly" and photo-mounting, paste-up and inking of forty-eight plates for document HW-30335.

Graphics services for Pile Technology include preparation of six graphs on slug corrosion for document HW-31497; preparation of two slides on test apparatus; layout and inking sixteen graphs and figures for document HW-30574 titled "Effect of p^H Alum Silica Treated Columbia River Water"; preparation of eight plates of photo copy for document HW-30598; and layout, paste-up and inking thirteen plates for document HW-30902 on "Process Arrangements and preparation of schematic diagrams of test apparatus".

Graphic services for Fuel Technology included preparation of a flow diagram and five photo copy plates for document HW-29757 titled "Laboratory Development of an Electromagnetic Test for Uranium Quality". Two of the above plates, "Response to Cracks" and "Response to Inclusions", were prepared for slide specification as well as formal report dimensions. Additional work for the unit include paste-up and photo copy preparation for a number of routine informal reports.

Graphic work for the Minor Projects Section involved development of a transparent reproducible map of the Hanford Area titled "Review of Real Property Holdings".

10 non-routine IBM jobs were completed for the Engineering Department.

FOR THE PLANT AUXILIARY OPERATIONS DEPARTMENT

A stratified sample was taken of Central Stores' 1953 docking reports to determine if any improvements are possible in the unloading, checking, and storage procedures. The amount of material coming in by parcel post, express, truck freight, and car loads was estimated for each day of the week. The analysis showed, in addition to other factors, that there exists a much larger work load on Mondays.

Regarding the study of utilization of Area Stores vs. Central Stores, data have been compiled on the number of transactions and distribution of dollar value of the orders for Central Stores and each Area Store. In addition, data were compiled on how much goods each area uses, what type, and where it comes from. This information, together with the costs of operating the various stores, will be used to evaluate the present area store system.

The problems in connection with the control of Standby Inventories are being studied under an Operations Research Program. In conjunction with this study, a proposal of an inventory control system is being prepared. This system will indicate the various sources of information and the reports and controls that need to be

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established or maintained to adequately control the inventory quantities and value. One of the prime objectives of the system is to establish controls that will minimize the possibility of not having a sufficient quantity of any critical item on hand.

The second progress report for the Operations Research Program on Inventory Control was presented to management. Assistance has been given to the various sections affected by the recommended changes to explain the purpose of the change and to aid in the installation of the new systems and methods.

The Electrical Substation Operations program has been completed. The formal report on this program is being prepared and will be issued shortly. This report presents comparisons of the costs and effects of alternative situations and discusses nonquantitative factors that could affect management decisions.

It will be recalled that the Telephone operations research program was initiated for the following purposes:

1. To study the routing of calls within the telephone system on the premise that the proportion of incompleted calls could be reduced by a formal analytical method.
2. To study the clerical procedures of the Telephone Unit in an effort to eliminate unnecessary paper work.
3. To make an economic study of toll calls versus leased lines for official uses.

Progress Report 1 was issued during the month on the first phase of the program. Recommendations in that report to reduce the proportion of incompleted calls by regrading second selectors were accepted by the Telephone Unit. The potential improvement will eliminate a large number of incompleted calls over the period of time remaining until completion of the additional Richland exchange. Business and official subscribers in the fourth level will receive the majority of the improvement. The actual regrading has been carried out.

The second phase of the program, the study of clerical procedures, has also been completed. Results indicated that the Telephone Unit is performing its internal functions in an efficient manner with a small, well organized clerical staff. The majority of changes that could simplify their work involve accounting practices rather than internal procedures. The results of this phase of study will be presented with the third phase of the program upon completion of it.

Work has begun on the third phase of the program. In this phase of the study an attempt will be made to provide a mathematical basis for the selection of an economic number of leased lines. Data are presently being collected from leased line and toll tickets in order to secure a knowledge of local patterns in the usage of long distance calls. Anticipated subjects of investigation include traffic, delay times, day of week and hour of day fluctuations, and utilization of leased lines.

The Transportation operations research program has been started. Preliminary work to date involves scoping the program. The first phase of operations on this

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gram will be to study utilization of vehicles for a section in the 100 Areas.

Security problems in connection with classified copies and the audit function of the Security and Patrol Unit were discussed in detail with the units supervision. Broad use of the information available in the Classified File Machine Records and the incorporation of significant police information into these records for analysis and reporting purposes was approved. Classified files has not yet concurred with this policy.

Security has agreed that the many variables of employee attitude and such measure of risk of misplacing a classified copy should be mathematically analyzed to determine the most effective sampling system to audit chargees performance in regard to the handling of classified copies.

Pallet legs have been fabricated and will be tested in Central Stores. The purpose of the legs is to facilitate the stacking of pallets holding uneven items that cannot normally be stacked. A savings in space will be realized by stocking these pallets several high. Drawings of this equipment have been completed and are in the process of reproduction.

A procedures wagon to be used for wiring panels for IBM machines has been fabricated and put into use in the Computing building. It has expedited the wiring of panels by making the necessary components more accessible.

rty-six new or revised IBM internal operating procedures were prepared for the Computing Unit by the Procedures Unit.

Graphics work on Operations Research programs included development of a plate illustrating a "pallet" leg design recommended for space conservation use in the Central Stores Warehouse; preparation of flow chart work for the "Stand-by Inventory Control Study"; completion of an electrical flow chart for the "Electrical Substation Operations Report"; and completion of special assignments related to the above programs.

Additional graphics services for the Plant Auxiliary Operations Department included preparation of a dummy layout, preliminary study charts and various directed assignments relative to issuance of the first issue of the "Proposed Incentive Fee" report; layout of rough organization charts for departmental use; and completion of a series of cost distribution and record charts.

For the Plant Auxiliary Operations Department, 14 routine IBM machine reports and 5 non-routine jobs were completed for a total of 19 service requests.

FOR THE RADIOLOGICAL SCIENCES DEPARTMENT

The first of a five-part preliminary report on the radiation exposure records problem has been completed. This report will describe the existing procedures for

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recording and reporting exposure data in five separate parts: Area badges, pencil meters, special monitoring instruments, bioassay-internal radiation monitoring, and record room activities. Each part will describe routine and nonroutine procedures as well as the many records and reports involved. Upon completion of the report, a recommendation will be made to the Exposure Records Unit regarding the possible application of machine methods to this extremely large data processing problem.

The problem of predicting mathematically the distribution of a contaminant at points downstream from the effluent duct of a retention basin is receiving further study. The result of this study should enable the Radiological Engineering Section to better control the depositing radioactive materials on the river banks. A subsidiary problem involves the heat which the effluent water contains. Since the intake ducts for piles downstream pick up some of this heat, it is very advantageous to know just where to place the various ducts so as to avoid as much as possible taking the heat of one pile into the next pile downstream. It is perhaps obvious that it is undesirable to have contaminated water go through the purifying and pumping system. A rigorous solution to either of these problems is out of the question, since this would demand mapping of the river channel and velocity distributions, both of which suffer seasonal variations.

Three experiments have been conducted with sheep to determine the effects of feeding radioactive material on the various constituents of the blood. Seasonal, age, and time effects will be analyzed. The results of these studies will supply pertinent information for radiological health standards.

Routine computational work for the Radiological Sciences Department consisted of weather calculations for March, wind calculations for February and March, thyroid and radioanalysis calculations, and aquatic biology calculations. In addition, extensive summaries of sheep thyroid and aquatic biology data were completed. The data for both summaries cover a four-year period. The thyroid summary consists of a listing of some 35,000 cards by sheep group, animal number, and date. The aquatic biology summary required the calculation of average radioactivity of samples, and involved some 20,000 cards.

Graphics work for the Standards Unit included preparation of two visual aids titled "Highest Animal Exposure and Whole Body Exposures"; and completion of a contamination measurement record table combined with a map of the Columbia River.

Three charts were prepared on the subject "Distribution of Radioactivity in the Columbia River" for Aquatic Biology to use in a paper presented to the American Water Works Journal. A large map of the area showing general contamination levels on the railroads was prepared for Biophysics. Additional graphics services for the Radiological Sciences Department included preparation of preliminary layouts for the new organization charts; paste up and photo retouch for a formal report; and preparation of overlays for contamination recording on maps used in the Standards Unit chart room.

Five routine IBM reports and 1 non-routine job for a total of 6 IBM service requests were completed for the Radiological Sciences Department.

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FOR THE EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

The first set of personal accident study reports were delivered to the Industrial Medical Unit. Two types of reports were prepared; one showing the relative ranking of organization units with respect to accidents per person ratio, and one listing those persons with a large number of accidents during the quarter. It is planned to continue these reports on a quarterly basis beginning in May.

A study is being made of the flow of inpatient paperwork at the Kadlec Hospital. Currently seven to nine separate forms, depending upon the type of treatment, must be completed for each patient. Objectives will be to eliminate repetitive typing of common information required on each of these forms and to improve the flow of the forms.

Reports were prepared to show the occupational qualifications of all personnel employed by General Electric at Hanford. These reports will be used to locate employees with experience and training in specified fields other than those fields in which they are now working.

A questionnaire has been prepared for use in conjunction with the showing of an orientation film to new employees. The purpose of the questionnaire is to determine if the film is serving its purpose in supplying new employees with information on certain GE policies and plans. When a sufficient number of questionnaires have been filled out, the responses will be tabulated and analyzed statistically.

The injury control charts for departments and major sections have been revised, and are presently being processed by the Graphics Unit. New expected values and limits of the expected variation of the monthly injury rates were calculated where needed, that is, where a trend in the past year's data made the previously calculated control values no longer applicable.

The Employee and Public Relations Department requested a summary of one particular question on the 1953 attitude survey dealing with the Suggestion Award system. This was obtained for personnel classes within units, within sections, and within departments.

Graphics work for the Employee and Public Relations Department included preparation of two rate comparison charts on "HAPO Average Rates vs. Northwest Area Average"; completion of a chart titled "HAPO Age Group Study By Crafts"; preparation of three plates for slides on Hospital Statistics from 1946 to 1953; preparation of two salary study survey charts; and preparation of one large visual aid for training purposes.

For the Employee and Public Relations Department 40 routine IBM reports and 4 non-routine jobs were completed for a total of 44 IBM service requests.

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FOR THE FINANCIAL DEPARTMENT

It was desired by the SF Accountability Section of the Financial Department to know if the factor weights in use for charging uranium from the 300 Area to the 100 Areas give results which agree favorably with the actual weights of buckets of irradiated slugs. To do this it was necessary to consider the average weight of both four and eight-inch slugs, the average weight of the aluminum jackets and bonding layers, the loss of aluminum in the pile due to corrosion, and the volume of the slugs (which determine the amount of water displaced). The weight of water displaced by the slugs must be considered since the actual bucket weights are obtained by underwater weighing. The variation introduced in bucket weights due to the known variations in each of the above factors was also considered. (Confidential-Undocumented report, "Estimated vs. Observed Bucket Weights", to V. D. Donihee, dated April 28, 1954.)

Data from recent chemical analyses of five bronze crucibles were analyzed to obtain estimates of the average SF material content and the sampling and analytical errors associated with these analyses. A 95% level confidence interval was also found and reported for the true average SF material content for the five crucibles. (Oral report: to C. B. McKee.)

Data on the "70-58" and impurity content for a sample of 30 shapes case since April 1, 1953 were analyzed to determine if there was evidence of a recent change in the average plutonium content for shapes. Based on the recent data, there was no evidence of a change from the average observed approximately a year ago. The precision observed a year ago was also essentially the same as was estimated from the recent data. Therefore, it was recommended that the use of the established factor and associated precision be continued and that periodic re-examination be continued. (HW-31678, "Review of Plutonium Content Factor for Shapes", to C. J. Shortess, Jr., dated April 29, 1954.)

Data has recently been obtained on the empirical "F" factors computed as the ratio of the chemical assay to X-ray assay for material processed through Redox since February 1, 1954. An analysis will be made on this data to determine if there is evidence of nonrandom timewise variations similar to the deviations observed in empirical "F" factors computed during 1953. If nonrandomness is indicated, further investigation will be required in an effort to determine the source of the trouble.

Work is being started on obtaining an objective method of determining what are reasonable shipper-receiver differences on nitrate shipments due to the random errors inherent in the method of analysis. Until recently, poor unloading techniques at the receiver's plant made such a study impractical.

A short table of precision to be associated with various numbers of predicted grams of product is being prepared for use by personnel of the Measurement Methods Unit. This table is based on recent studies of the precision of predicted g/t from MWD/t made by personnel of the Technical Statistics group.

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[redacted]k is being continued on the problem of fitting by statistical techniques a calibration curve to the original calibration data for tank 15-6. This problem will be completed in the near future.

As a part of an operations research program on data processing, work on the preparation of flow charts for production data in the Reactor Section has been conducted. Preliminary investigations of the flow of production data in the Separations Section have been started.

Existing procedures for the machine preparation of gas and oil reports and for exempt salary distribution were revised to conform with requests from the Financial Department.

A report was prepared listing all General Electric employees at Hanford by years of service within groups of 5 years. This listing will be used in setting up the Service Recognition Plan.

The payroll procedure for Computing has been revised to comprehend the changes made to the time card. The procedure has been installed and is currently being used. In addition to the changes made in connection with the new time card, the separate listings of debit and credit vouchers are eliminated. Certain special payments such as military duty and encampment will now be identified and may be segregated for future statistical and salary distribution purposes. Also, several revisions were made to eliminate or combine processing steps. During this revision groundwork was laid for the [redacted]or revision to be completed by July 1. Based on the information obtained [redacted]om the processing of the payroll on the revised procedure for the first week, it appears that operating time has been reduced by several hours.

As part of an operations research program on data processing, work on an investigation of the usefulness of input-output models at Hanford Atomic Products Operation has begun with discussions with members of the Financial Department.

For the Financial Department 532 routine IBM machine reports and 15 non-routine jobs were completed for a total of 547 service requests. In addition, 25,457 paychecks and 25,457 earnings statements were prepared and 25,453 cancelled paychecks were reconciled.

FOR THE ATOMIC ENERGY COMMISSION

The statistical methods used in determining the relationship between g/t and MWD/t and establishing the precision associated with this curve as reported in HW-30990 have been requested by the Atomic Energy Commission statisticians. A detailed outline of the estimating procedures will be prepared.

The Hanford release report for March was completed. Hereafter, the time of day appearing in this report will be given in Universal time.

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For the Atomic Energy Commission 3 non-routine IBM reports were prepared.

SUMMARY

During the month of April 120 statistical, mathematical, procedural, and graphical problems were completed, and as of April 30, a backlog of 207 problems were on hand. In addition 594 routine IBM reports and 57 non-routine IBM jobs were completed for a total of 651 IBM service requests; 25,457 paychecks, 25,457 earning statements were prepared, and 25,453 cancelled paychecks were reconciled.

A total of 95 new forms were designed; 312 orders for forms were reviewed of which 2 were rejected and 300 were approved for a total of 2,086,380 copies.

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Department Serviced	Percent of Services Rendered					
	Units					Operations Analysis Section
	Applied Mathematics	Procedures	Computing	Graphics		
Manufacturing	13	1	3	18		7
Engineering	34	13	27	34		28
Plant Auxiliary Operations	2	18	4	8		6
TOTAL OPERATING DEPARTMENTS	49	32	34	60		41
Radiological Sciences	12	1	3	14		5
Employee & Public Relations	1	11	1	10		4
Financial	8	12	61	4		34
TOTAL STAFF DEPARTMENTS	21	24	65	28		43
Operations Research	26	43	0	12		15
A. E. C.	4	1	1	0		1
TOTAL	100	100	100	100		100

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